SYLVAN SLOUGH
ROCK ISLAND COUNTY
ROCK ISLAND, ILLINOIS
LPC# 1610650045
SUPERFUND/ HRS
IL0000926220

CERCLA

Site Inspection

Prepared by:
Office of Site Evaluation
Division of Remediation Management
Bureau of Land

SITE INSPECTION

for:

Sylvan Slough
Rock Island, Illinois
IL0000926220

PREPARED BY:
ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
BUREAU OF LAND
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1.0 INTRODUCTION

On May 8, 2009, the Illinois Environmental Protection Agency's (Illinois EPA) Office of Site Evaluation was tasked by the United States Environmental Protection Agency (U.S. EPA) Region V to conduct a Site Inspection at the Sylvan Slough site located in Rock Island, Illinois. The Site Inspection (SI) is performed under the authority of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) commonly known as Superfund. Sylvan Slough is located along a secondary channel of the Mississippi River as it flows through the Quad Cities, in northwestern Illinois and eastern Iowa (Illinois EPA, 2003). The primary portion of the slough that is of concern in this investigation is between 45th Street and the Iowa Interstate Railroad Bridge, in Rock Island, Illinois. A significant feature of the site is a 30-inch storm sewer outfall that released oil into the south side of the slough in the late 1980's and early 1990's. The outfall is located at Township 18N, Range 2W, in Section 36 at latitude 41.5103456 ^{o} and longitude -90.554101^{o}. Figure 1 of this report identifies the general aspects of the area. Figure 2 shows the location of historical oil releases to the slough.

The primary objective of a Site Inspection is to gather necessary information needed to evaluate the extent that a site presents a threat to human health and/or the environment. This is collecting and analyzing wastes and environmental media samples to determine whether hazardous substances are present at the site and are migrating to the surrounding environment. At the conclusion of the Site Inspection, a determination will be made whether the site qualifies for additional evaluation under Superfund or should be dropped from further Superfund consideration. Additionally, the Site Inspection supports removal and enforcement actions and collects data to support further Superfund or other response actions.

The Site Inspection is not intended to be a detailed evaluation of contamination or risk assessment. If the evaluation of the site indicates that the site qualifies for additional Superfund evaluation, an Expanded Site Inspection may be conducted. In some cases an Expanded Site Inspection will be conducted to address critical hypotheses or assumptions that were not completely supported during the SI. The SI is performed under the authority of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) commonly known as Superfund.

Sylvan Slough (IL0000926220) was placed on CERCLIS (Comprehensive Environmental Response, Compensation and Liability Information System) on December 18, 2002 due to a request for discovery action initiated by the Illinois Environmental Protection Agency. The discovery action was taken based on results of investigations of adjacent properties indicating that contaminants were discharged to the slough. (Illinois EPA, 2003)

In consideration of the number of facilities along the slough and extensive operational and environmental history of several of the industries, the main text of this report will deal in general terms with regard to specific industries, focusing largely on those involved in removal actions taken or overseen by U.S. EPA. It is presumed that the companies involved in U.S. EPA action were also those contributing to the contamination in the sediments of the slough, which in-turn led to the placement of the slough on CERCLIS.

Appendix A contains descriptive information for key industries along the slough (including those involved in U.S. EPA led response activities, as well as those that dealt with environmental concerns under another regulatory framework or voluntarily). In addition, historical information is provided in Appendix A regarding: operations; environmental concerns and releases; and investigation and clean-up activities at key industries.

It should be noted that certain portions of the Rock Island Army Arsenal (a prominent facility on the north side of the slough) are currently undergoing CERCLA investigation/remediation/feasibility studies under U.S. EPA and Illinois EPA oversight along with the Department of Defense and Army Corps of Engineers.

Extensive sampling and analysis of the sediments in the slough adjacent to the Arsenal has been conducted and is being evaluated by the respective agencies. The historical review, background research, and environmental sampling conducted under this SI is not intended to evaluate impacts to the Sylvan Slough caused by the Rock Island Army Arsenal. Analytical results and conclusions reached under this SI should be considered to represent the Sylvan Slough in- general, with an overall focus on the impacts from the facilities on the south side of the slough, particularly those involved in the U.S. EPA removal and oversight activities initiated in 1993.

2.0 SITE BACKGROUND

2.1 Site Description

Sylvan Slough is located along a secondary channel of the Mississippi River as it flows through the Quad Cities, in northwestern Illinois and eastern Iowa. In the Quad Cities area, the Mississippi River splits at Rock Island, with the main channel flowing along the north side of the Island. The smaller channel forms Moline Pool on the southeast side of the Island and flows west approximately one mile to Sylvan Island. The water flows through two man-made dams around the south side of Sylvan Island and forms Sylvan Slough. The slough flows west for approximately two and a quarter miles where it re-joins the main channel of the Mississippi River. Figure 1 of this report identifies the general aspects of the area. Figure 2 shows the location of historical oil releases to the slough. (Illinois EPA, 2003; USGS)

The average width of the slough is approximately 400 feet. The site is located in the densely populated Quad Cities area with the cities of Rock Island and Moline lying on the south (Illinois) side of the river and the cities of Davenport and Bettendorf lying on the north (Iowa) side. The slough is crossed by two bridges near the west end: a double-decker railroad/highway bridge extends from the city of Rock Island across the slough to Rock Island Arsenal and then across the Mississippi River to Davenport, Iowa; and a highway bridge extends from the city of Rock Island across Sylvan Slough to the west side of Rock Island Arsenal to handle daily traffic to and from the arsenal. The Rock Island Arsenal located on Rock Island forms the northern boundary of the slough. A bicycle path and a number of active and closed facilities are located on the south side of the slough. (Illinois EPA, 2003)

Sylvan Slough has several sensitive environments that could be impacted by human activity. According to the Illinois Department of Natural Resources the Sylvan Slough Mississippi River Mussel Sanctuary is habitat to a number of species of mussels including state threatened (*Ellipsaria lineolata*) and federally and state endangered Higgins' Eye Mussel (*Lampsilis higginsii*). The slough is also part of the Mississippi River Moline INAI (Illinois Natural Area Inventory) site. It is also considered a State Designated Natural Area. Arsenal Island is an important winter feeding area for the federally threatened bald eagle (*Haliaeetus eucocephalus*). (Illinois EPA, 2003)

The north and the south side of the slough is highly developed. Beginning in the early 1800's, Arsenal Island was used as a Fort, a prison for confederate soldiers, and its use by the federal government to manufacture various weapons continues to this day. Since the mid-to-late 1800's the 2.5-mile stretch of the south shore of the Sylvan Slough has been home to many industries including: tractor and farm implement manufacturing; bulk oil sales and storage; manufactured gas production; hydroelectric generation; railroad depot and maintenance facility; and a water treatment plant. A number of pipes carry storm water run-off and wastewater into the slough from the south. The frequency of releases of oil and other petroleum products from the discharge pipes into the slough seemed to increase in the early 1990's. A few large and persistent oil releases into certain areas of the slough prompted U.S. EPA response and enforcement activity at the slough in 1993. Facilities involved with the U.S. EPA's initial response action in 1993 and the years following were: International Harvester (Navistar); Quad Cities Industrial Center; Iowa Interstate Railroad (IIRR); and Burlington Northern and Santa Fe Railroad. (The U.S. EPA's emergency response and enforcement activity conducted at the slough beginning in 1993 is referred to in this report as the "Sylvan Slough Removal

Project".) Other facilities located along the slough were addressed under other regulatory programs or addressed voluntarily and include: Quad Cities Civic Center; Rock Island Arsenal; John Deere Seeding and Cylinder; Mid-American Energy Corporation; Moline North Sewage Treatment Plant; and Midway Oil.

The "Sylvan Slough" was added to U.S. EPA's Comprehensive Environmental Compensation and Liability Information System (CERCLIS) in 2002. The justification for listing the slough on CERCLIS was apparently the presence of environmental contaminants detected in the sediments of the slough coupled with the presence of numerous industries in the area and history of oil releases.

Figure 1 of this report identifies the general aspects of the area. Figure 2 shows the location of historical oil releases to the slough along with features of the U.S. EPA's removal action initiated Sylvan Slough Removal Project. Figure 3 identifies industries along the Sylvan Slough and SI sediment sampling locations.

2.1.1 Sylvan Slough Removal Project Area

The Sylvan Slough Removal Project Area includes a region south of Sylvan Slough and generally north of 5th Avenue and extending from 44th Street on the east to 28th Street on the west. The Sylvan Slough Removal Project Area includes properties where oil was seen discharging into the slough or where oil was found on the surface of the slough and was addressed by U.S. EPA in their initial emergency response in 1993 or subsequent actions conducted or overseen by the removal program.

Facilities involved with the U.S. EPA's initial response action in 1993 and the years following were: International Harvester (Navistar); Quad Cities Industrial Center; IIRR; and Burlington Northern and Santa Fe Railroad.

2.1.1.1 International Harvester (Navistar)

The International Harvester (IH) property once occupied approximately 86 acres south of the Sylvan Slough and north of 5th Avenue in Rock Falls (Shih). The property extended from approximately 28th Street on the west, to 44th Street on the east. International Harvester built a variety of farm-related equipment at the facility (Shih). In 1988, Navistar sold all but 20 acres to the City of Rock Island (Shih).

The 20 acres retained by Navistar is a strip of land, which parallels the Sylvan Slough (Shih). The western portion of the property is known as the oil remediation site and contains numerous monitoring and extraction wells along with treatment equipment installed in response to an Administrative Order on Consent with U.S. EPA in 1994 (U.S. EPA, 1994). Contamination at the western portion of the property was found to be primarily the result of a release back in the 1960's from a fuel tank located on the Rock Island Railroad property to the south of Navistar (Shih).

The eastern portion of the land retained by Navistar contained seven (7) buildings adjacent to the shore of the Sylvan Slough. Three (3) separate outfalls enter the slough from the eastern portion of the Navistar property. Two of the buildings housed wastewater treatment units for the facility which were connected by various piping and ultimately connected to one of the outfalls into the slough. Throughout the years of operation, nine separate underground storage tanks (USTs) were used for storing oils and various liquids (with recorded volumes ranging from 12,000 to 22,000 gallons per tank). (ARCADIS)

2.1.1.2 Quad Cities Industrial Center

In 1988 Navistar sold 66 acres and associated buildings to the City of Rock Island for $1.00 (Shih). The City then conveyed the property to L.R.C. Developers, Inc. and it became known as the Quad Cities

Industrial Center (QCIC) (Shih). At the time when the property was sold to the city, there were a total of 46 interconnected structures totaling approximately two million square feet (Terracon, 2009). The new owners demolished and removed all but five structures, which now totals approximately one million square feet (Terracon, 2009).

A voluntary investigation conducted under Illinois EPA's Site Remediation Program was conducted on the eastern half (approximately 33.5 acres) of the QCIC property in 2008 and 2009. The investigation identified nine (9) former and existing USTs, all with reported volumes of 12,000 gallons per tank. A quench oil cellar containing three (3) 12,000 gallon tanks was identified to be the source of free-phase product approximately ten feet below ground surface in the center of the facility. (Terracon, 2009).

The City of Rock Island's 44th Street Storm Sewer runs beneath the eastern portion of the facility and discharges into the slough (Kammueller, 1992). Beginning in 1992 oil was observed discharging into the slough from the 44th Street Storm Sewer outfall. Investigation of the sewer identified petroleum product seeping into the sewer approximately 1000 feet south of the slough, near the QCIC building (formerly belonging to Navistar) (Kammueller, 1992). Three (3) 12,000 gallons USTs were present in the building next door and adjacent to the area of concern in the sewer (Terracon, 2009). Releases that had occurred from the tanks were later identified under the investigation conducted by Terracon on behalf of QCIC in 2008 – 2009. In the 2008-2009 investigation, Terracon identified benzene and polynuclear aromatic hydrocarbons in the soils in the vicinity of the three tanks. Vinyl chloride and trichloroethylene were identified in groundwater around the tanks and also around the Rock Island 44th Street Storm line that discharges into the slough.

2.1.1.3 Iowa-Interstate Railroad

The Iowa-Interstate Railroad (IIRR) owns and operates approximate 28 acres in the project area. The acreage includes the tracks and railroad right-of-way plus an open space amongst the tracks which served as a rail yard (Sanborn, 1950). The rail yard is located north of the current Augustana College campus, and once contained a roundhouse, several stock houses, and a machine shop (Sanborn, 1950).

In approximately 1964, while owned by the Chicago, Rock Island and Pacific Rail Road, a large diesel fuel spill (volume unknown but estimated by some to approach tens of thousands of gallons) occurred from an above-ground tank (AST) in the rail yard (Geraghty & Miller). Although studies confirmed that diesel fuel had seeped into the ground and was floating on top of shallow groundwater near the tank, no action was taken to mitigate the problem (Geraghty & Miller). The contamination remained in the subsurface and may have been the source behind a release into the Sylvan Slough in 1979 (Kammueller, 1990).

2.1.1.4 Burlington Northern & Santa Fe Railroad

The Chicago, Milwaukee, St. Paul and Pacific Railroad and the Chicago, Burlington, and Quincy Railroad initially owned tracks traveling through the rail yard that is now owned by IIRR. (Sanborn, 1950).

The Chicago, Milwaukee, St. Paul and Pacific Railway owned trackage on the north side of the rail yard. Bankruptcy in 1977 placed the tracks in the hands of the Canadian Pacific Railway (Encyclopedia of Chicago). The Canadian Pacific Railway no longer owns tracks in Rock Island. (Canadian Pacific).

The other railroad company with tracks in the rail yard, the Chicago, Burlington, and Quincy Railroad, ultimately became the Burlington, Northern Santa Fe Railway (Burns). In 1970, the Chicago, Burlington, and Quincy Railroad merged with several other railroad companies to become the Burlington Northern & Santa Fe Railroad (BNSF) (Burns). Through the 1970 merger, BNSF become owner to several tracks in the Sylvan Slough project area as well as approximately 5 feet of shoreline along the south side of the slough.

2.1.2 Facilities Along the Sylvan Slough

This section describes some of the more prominent facilities bordering the slough on the north and the south are included below. The facilities described below may have impacted the slough but are not included in the removal actions overseen by U.S. EPA.

Quad Cities Civic Center

The Quad Cities Civic Center is located south of the slough between 12th and 14th Streets in the City of Moline. The property was originally the easternmost portion of Deer Plow and Planter Works which was donated to the city. Prior to construction of the Civic Center, environmental investigations identified USTs, and associated contaminated soil and groundwater. The UST tanks were excavated and the petroleum product was removed along with contaminated soil. During construction of the Civic Center, old cutting oils were identified in the subsurface at three caisson locations. Product was removed via excavation and a groundwater pump and treat system was installed to Illinois EPA's satisfaction. (Terracon, 2003)

Rock Island Arsenal

The Rock Island Arsenal is located on Arsenal Island which forms the northern shore of the slough. The facility consists of approximately 946 acres. The island has a long history of use as a military base and manufacturing center and is presently the largest government owned and operating arsenal in the country. A 20-acre inactive landfill is present on the south-central part of Rock Island and borders the Slough. The Old Landfill is an inactive industrial landfill that operated between 1920 and 1965. It was located at the south- central part of Rock Island Arsenal bordering Sylvan Slough and consisted of approximately 20 acres. Waste oils, and other industrial wastes were believed to have been disposed of onsite.
(Illinois EPA, 2003)

The landfill and the arsenal are currently being addressed under CERCLA Section 120 and the Defense Environmental Restoration Program with oversight by Illinois EPA (Lake). Sampling and analysis has been conducted from all medias surrounding the landfill including sediments and surface water in the slough. Compounds detected most often were chlorinated solvents and semi-volatile organic compounds (SVOCs) (SAIC). Illinois EPA is the lead agency and administrative controls are in place that will ensure that all issues at the facility will be addressed in accordance with CERCLA.

John Deere Seeding and Cylinder

John Deere Seeding and Cylinder, formerly John Deere Plow is located at 501 River Drive (formerly Third Avenue) in Moline (B&V). John Deere has manufactured farm equipment, hydraulic cylinders, and hardware at this location since 1837 (B&V; Jones). The facility has grown westward beginning with a 10-acre facility in 1837, expanding to approximately 70 acres prior to donation of property to the City of Moline.

Major manufacturing processes conducted at the facility included heat treating, casting, forging, grinding, painting and paint stripping, and chromium and nickel plating of various tractor parts (Sanborn, 1957; Jones). The facility was actively managed under the Resource Conservation and Recovery Act (RCRA) program. Deere has utilized Illinois EPA's voluntary program to close several units as well as USTs at the facility property (Rickert; Munie).

MidAmerican Energy Company

MidAmerican Energy Company is located at 100 2nd Street in Moline Illinois. The facility houses a low head hydroelectric plant occupying six acres and commonly referred to as the "Moline Generating Plant". MidAmerican Energy was formerly known as Iowa-Illinois Gas and Electric. The property currently owned and operated by MidAmerican once contained a Manufactured Gas Plant (MGP) that was owned and operated by People Light & Fuel Company, which later became known Peoples Power & Light Company . (Sanborn, 1892 and 1912; Baker, 1990)

In 1990 Iowa-Illinois Gas and Electric began a multi-phase investigation of the MGP property including soil, groundwater, and geophysical investigations (Baker, 1991). Based on the investigation results, Baker later conducted a feasibility study and risk assessment which were completed in 1995 (IT Corp, 2001). In the summer of 1995, 2,300 cubic yards of contaminated soil was excavated from the property and shipped off-site for treatment. Groundwater monitoring and further analysis under Illinois EPA voluntary program was completed in 2001.

Moline North Sewage Treatment Plant

The City of Moline constructed its North Slope Water Pollution Control Center (sewage treatment plant) on the south shore of the secondary channel of the Mississippi River in 1966 (City of Moline). The 3.5 acres facility is located at Seven 1st Avenue in Moline. In accordance with an 1938 aerial photograph of the area, the property appeared to be residential prior to its development by the City (USDA). In 1976 the facility was updated to provide secondary treatment for the wastewater prior to discharge into the Mississippi (City of Moline).

In approximately 1992, the city started receiving complaints about oil discharging from its 44th Street 72-inch storm sewer entering Sylvan Slough just west of the treatment plant (Kammueller, 1992). Upon further investigation, the city observed that the oil was entering the storm sewer beneath a parking lot located between 1st and 4th Avenues, and east of what was the QCIC's office building in 1992 (Kammueller, 1992) . The sewer pipe was approximately 17 feet below grade at the point where oil was penetrating the sewer line's concrete collar (Kammueller, 1992). Based on the location where the oil was entering the sewer line, it is unlikely that the sewage treatment plant or the city's associated property had caused the oil observed in the slough. (A Site Investigation conducted in 2008 at the Quad City Industrial Complex noted the presence of three 12,000-gallon underground storage tanks at the old Farmall / International Harvester Facility just east of the area of concern within the storm sewer.)

<u>Midway Oil</u>

The Midway Oil Company is located at 4301 1st Avenue, Rock Island, Illinois. Midway Oil was the former site of a fueling station, storage facility, and warehouse that began operations at this address circa 1945 continuing through the mid-to-late 1980s. Historically, the 0.5-acre property contained as many as eight petroleum storage tanks. Investigations conducted in 2001 identified contaminants in soil and groundwater at concentrations exceeding Illinois EPA's TACO values for commercial properties. (Missman, 2001)

Five areas on the site underwent soil excavation and treatment totaling 400 cubic yards of soil. The Midway Oil property ultimately became part of several properties along the south side of Sylvan Slough, that the city of Rock Island planned to use to create a “passive recreational venue” known as the Sylvan Slough Natural Area (Missman, 2004). The other two properties are adjacent to the east and are known as the “Willey” and “Andich” properties that also required remediation due to environmental concerns (EnviroNET, 2006b). Approximately 4,365 cubic yards of soil contaminated with inorganics, volatile organics, and semi-volatile organics was excavated and placed in bio-piles for biodegradation along with nutrients and compost material (Environet, 2006b). Sampling was conducted to confirm that soil in the bio-piles met corrective action objectives (Environet, 2006b).

2.1.3 Site Geology

Surface and near-surface soils in the site area are predominantly man-made fill along with sand and gravel river deposits overlaying either river sediment or shale and limestone (Geraghty & Miller; Terracon, 2009). In the western portion of the site fill material was brought in to raise low-lying areas often flooded by the Mississippi River (Geraghty & Miller). Fill material consists largely of black sands and cinders. In areas where no fill material was brought in, soils encountered consist strictly of river sand and gravel deposits (Geraghty & Miller).

2.2 Site History

Discharges of petroleum substances into the slough has presumably occurred since development began on the south shore of the slough in the mid-to-late 1800's. Historically, manufacturing operations along the slough in need of a discharge location for wastewater chose to discharge to the slough which was lower in elevation than the surrounding surfaces. The discharge pipes (also known as "outfalls" or "point sources") from the facilities often served for planned discharges as well as accidental release points for spills, etc. Governmental documentation and response to releases to the slough was recorded as early as 1964 when officials with Rock Island County and Illinois Department of Public Health responded to a diesel fuel leak from a 150,000 gallon above ground storage tank (AST) at property owned by Rock Island Railroad (now IIRR) (Geraghty & Miller). The leak in 1964 reached the slough through two separate discharge pipes (Geraghty & Miller). Follow-up inspections noted that the majority of oil (or degraded diesel fuel) discharging to the slough form the spill was entering through a 1000-foot seep along the river (also known as a "non-point source" where a general area is discharging material instead of a single pipe) (Geraghty & Miller). An estimate on the amounts of product lost from the AST was on the order of "tens of thousands of gallons" (Geraghty & Miller). Other releases to the slough from non-point sources were later documented by the Illinois EPA beginning in 1980 (USEPA, 1997).

Beginning in 1979, Illinois EPA staff began to document oily releases to the slough from several outfalls in particular (Kammueller, 1990). During an inspection in December of 1979, Illinois EPA identified a "small diameter pipe (~15")" approximately 50 feet upstream of the railroad bridge and adjacent to BNSF with oil around its outlet (Kammueller, 1990). Following Illinois EPA's report of a release in 1979, no records could be identified that documented additional releases of an oily nature into the slough until complaints were received by Illinois EPA in September of 1990. Complaints of oil entering the Sylvan Slough through outfalls near the QCIC were received by both Illinois EPA and the City of Rock Island in 1992 (Kammueller, 1992). In response to the complaints, the city of Rock Island investigated several potential sources and identified oil releases into the slough from the following release points:

1. Rock Island 44th Street 72" Storm Sewer Outfall
2. Area near International Harvester NPDES Outfall 001 (property now QCIC); and
3. Old Outfall Area (30" BNSF sewer) due north of IAISRR maintenance depot (Kammueller, 1992).

Two other releases points were identified in the area of concern by governmental entities investigating the discharges:

4. Oil seep generally north of IAISRR maintenance depot; and
5. Rock Island 30th Street Storm Sewer Outfall (Park).

Illinois EPA met with representatives from Navistar, Midway Oil, IIRR, QCIC, and the City of Rock Island in January 1993 regarding the releases to the slough. Illinois EPA recommended that responsible parties take action to eliminate the release of oil to the slough. At that time, Illinois EPA was recommending any response be taken under the oversight of its Voluntary Clean-up Program. (Geraghty & Miller)

On February 4, 1993 a citizen reported a release of oil into the slough from an old outfall area due north of IAISRR (Release 3, identified above) (Park). The USCG responded to the release and identified an oily sheen on the slough at locations greater than two miles downstream of a submerged 30" diameter outlet sewer that was releasing the material near IAISRR (Bade). In the days following the release, the USCG and the City of Rock Island identified oil in a series of manholes and piping on BNSF property, that were apparently connected to the 30" outlet sewer.

The U.S. EPA began negotiations for remediation with several industries/property owners in the area surrounding the release. Navistar and Burlington Northern & Santa Fe agreed to address the situation in regards to the 30" outlet sewer on the BNSF property (although it appeared that the contamination was not the result of any of their own activities) (Perlman). Navistar and BNSF signed an Administrative Order on Consent (AOC) with U.S. EPA in 1994 requiring the investigation and remediation of the hydrocarbons entering the slough (USEPA, 1994). Regarding releases from Releases 1 and 2 (identified above), negotiations between Illinois EPA, U.S. EPA and responsible parties determined that parties would voluntarily address the contamination in actions separate from the 1994 AOC (Kammueller, 1993).

In 1995, oil was observed discharging through pipes associated with the old Farmall facility on a 20-acre parcel owned by Navistar. Upon further investigation the release was linked to Building 77, the old wastewater treatment plant. Under a voluntary action with USEPA, Navistar spent over $250,000 to clean and remove oily sludges inside Building 77 as well as the other remaining buildings and pipes on the 20-acre parcel. The discharge point was ultimately re-routed to the City's sanitary system. In 2001, Navistar received closure of this issue from USEPA. Navistar then returned the property back to the City of Rock Island. (Shih).

2.2.1 Federal and Private Response to Site Releases

2.2.1.1 Response to Release Locations 1and 2

The Midway Oil Company site is located within approximately 500 feet of Release Location 1 and 100 feet of Release Location 2. The facility contained as many as eight petroleum storage tanks on the property and one UST was located within close proximity to the flow path of the outfall identified above as Release Location 2. In approximately 2000, responsible parties began to investigate and address the soil and groundwater at the site. In accordance with TACO regulations, five areas on the site underwent soil excavation and treatment totaling 400 cubic yards of soil. The excavations were backfilled using treated soil and compost material. In consideration of site conditions and further analysis using formulas contained in the TACO regulations, no groundwater treatment was deemed necessary. (EnviroNET, 2006a)

The QCIC is also located in close proximity to Releases 1 and 2. The 72-inch Rock Island 44th Street Sewer (Release Location 1) runs adjacent to, and beneath the old Farmall facility (Navistar) which is now the QCIC. Release Location 2 was an old outfall connected directly to the Farmall facility. In 2008 and 2009, Terracon Consultants Inc. conducted a multi-phased investigation on the QCIC property. Terracon's investigation identified several compounds that exceeded soil concentrations established in Illinois EPA's Tiered Approach to Corrective Action Objectives (TACO). In addition, one area was identified with free product present at approximately ten feet below ground surface. Terracon submitted a final Remedial Action Plan for the QCIC which was approved by Illinois EPA in 2010. The plan included over excavation in certain areas where soil exceeded objectives along with physical barriers to contamination and administrative controls to the property.

2.2.1.2 Response to Release Locations 3, 4, and 5

Navistar and BNSF began an investigation on the sources contributing to the Release Locations 3, 4, and 5 in the months following their AOC with U.S. EPA in 1994. By 1995, consultants for Navistar and BNSF had identified five separate areas totaling over three (3) acres where free-phase hydrocarbon was likely floating on the groundwater at the IIRR property (USEPA, 1998). In July of 1997 a product recovery system became operational to address the subsurface contamination that was impacting the slough trough pipes and seeps along the shore (Posteuca). As of January of 2011, the system had recovered over 1900 gallons of free product from the subsurface (Posteuca). The volume of hydrocarbon recovery per month has diminished significantly and Navistar believes that the remediation is nearing completion (Shih)

In 1998 IIRR and Heartland Corporation signed onto an Administrative Order on Consent with U.S.EPA to address source material on property owned by IIRR. Investigations completed by Navister and BNSF indicated that most (if not all) of the oil and petroleum product entering the slough through Release Locations 3, 4, and 5 was originated on the IIRR facility. It is believed IIRR and Heartland completed source removal at the IIRR property following the the agreement reached on the 1998 AOC (Shih). However, record of the removal or remediation activites could not be identified at U.S. EPA or Illinois EPA.

2.3 Previous Investigations

Sylvan Slough and adjacent properties have been inspected and samples analyzed during recent years.

2.3.1 Rock Island Arsenal

The Old Landfill at Rock Island Arsenal was the subject of a number of investigations since 1978. These included a Phase I Remedial Investigation conducted by Maxim Technologies in 1994 and 1995 and a Phase II investigation by Science Applications International Corporation (SAIC) completed in August 1998. During the Phase II investigation a number of field activities were conducted including the collection of surface water and sediment samples to determine if the Old Landfill is impacting Sylvan Slough. Contaminants found included volatile, semi-volatile, polychlorinated biphenyls, and inorganic substances. (Illinois EPA, 2003)

The Illinois Environmental Protection Agency (IEPA) in June 1999 conducted a

CERCLA Site Team Evaluation Prioritization (STEP) inspection at the site of John Deere Plow in Moline. This included the present active John Deere Plow property and the property adjacent to the east that Deere donated to the city. The donated property is now the site of the Quad Cities Civic Center. During the inspection five sediment samples were collected in the Mississippi River and Sylvan Slough. The one sediment sample collected in Sylvan Slough had elevated levels of bis (2-ethylhexyl)phthalate, arochlor-1260, lead and manganese that met Hazard Ranking System observed release criteria. (Illinois EPA, 2003)

Surface water and sediment samples were collected by SAIC from the Sylvan Slough again in 2001. Sampling locations were in the slough, adjacent to the old landfill on Arsenal Island. Samples were generally within 30 feet of the north shore of the slough. Contaminants found were similar to those in 1998 and included volatile, semi-volatile, polychlorinated biphenyls, and inorganic substances plus several dioxin/furan analytes. (SAIC)

In 2003, Illinois EPA conducted a CERCLA Preliminary Assessment at the Sylvan Slough. No samples were collected. In consideration of the PA investigations findings, the site was recommended for a CERCLA Site Inspection.

3.0 SITE INSPECTION

3.1 Sampling Activities

During the week of April 12, 2010 Illinois EPA conducted sampling activities at the Sylvan Slough Site. The sampling plan for the Site Inspection (SI) was designed to determine whether or not releases of oil and other substances from the south shore of the slough had impacted sediments in the area.

3.1.1 Sediment Sampling

On April 14, 2010, representatives from Illinois EPA conducted sampling and analysis of sediments on the south side of the slough. Four Illinois EPA staff members used an aluminum boat with a gasoline-powered outboard motor to travel to sampling locations in the slough. The team loaded the equipment and boarded the boat downstream of the site on the Mississippi River and traveled upstream to the site. Work began at the most downstream sampling location and worked upstream so that sampling activities in the sediment would not affect other locations. Sediment samples were collected using a stainless steel (SS) ponar dredge. The ponar dredge would be lowered quickly through the surface water on a disposable nylon cord until it made solid contact with the sediment. A spring-loaded mechanism allowed the sides of the dredge to close upon withdrawal and trap sediment from the top four to eight inches of the sediment surface (depending on composition). The dredge would be brought to the water's surface and into the boat for evaluation and further sampling. The sides of the dredge were opened on the deck of the boat to note the color, composition and any odor of the sediments. Sediments were then transferred to sample jars using a clean SS trowel.

A total of 17 samples were collected from 16 locations. Sample numbers were assigned to each sample ranging from X201 – X216 (sample X220 was a field duplicate of sample X210). The majority of the samples were collected approximately 50 – 100 feet north of the slough's southern shore. Each sediment sampling location was marked using a Trimble Global Positioning System. Two photographs were taken of each sediment location. Samples X201 and X202 were designated as background samples. The background samples were taken upstream of any of the recorded oil/petroleum releases that led to the federal response actions initiated at the slough in 1993.

Figure 3 of this report identifies sediment sampling locations. Table 1 contains sample descriptions along with other pertinent information about each sediment sampling location.

3.2 Analytical Results

Sediment samples collected for inorganic analysis were sent to ALS Datachem Laboratories in Salt Lake City, Utah through U.S. EPA's Contract Laboratory Program. Sediment samples for organic analysis were sent to Compu Chem (a Division of Liberty Analytical Corporation) in Cary, North Carolina through U.S. EPA's Contract Laboratory Program. A complete analytical data package including quality assurance review sheets and chain of custody documentation is located in Appendix E. The sample containers were packaged and sealed in accordance with Illinois EPA's Office of Site Evaluation procedures. Tables 2 – 5 provide laboratory results for inorganics, volatile organics, semi-volatile organics, and pesticide, pesticides/pcbs, respectively. Background concentrations are represented in each table as the highest ~~an average of~~ concentration~~s~~ observed at either of the two background sampling locations, X201 and X202. For the purposes of evaluation under the Hazard Ranking System (HRS), sediment concentrations are compared to background concentrations and any contaminants present at three-times the background concentrations, and which are attributable to the site, are termed an "observed release" (USEPA, 1992). In cases where the laboratory result for a particular analyte was below the detection limit in the background sample, any detectable concentrations in the downstream (release) samples would be considered and an observed release (USEPA, 1992).

In consideration of the laboratory results for sediment samples, three samples (X204, X205, and X216) met observed release criteria for one or more analytes. Only four compounds (all pesticides in samples X205 and X216) were present in multiple samples at concentrations that met observed release criteria. In Sample X216 the four pesticides, mentioned previously, were the only compounds meeting observed release criteria. Sample X205 had the most compounds meeting observed release criteria: 13 semi-volatiles, and 10 pesticides. Sample X204 had only one compound meeting observed release criteria, Arochlor-1262 (a PCB compound).

The comparison of laboratory results to sediment benchmarks (shown in Tables 2 – 5) identified organic constituents in sample X205 at concentrations above sediment benchmarks. Sample X205 had 10 semi-volatiles, and 2 pesticides greater than laboratory detection limits that exceeded benchmarks. Regarding inorganic constituents, all 17 samples, including the background samples had one metal, manganese, at concentrations exceeding a benchmark. In all 17 samples, manganese was present at concentrations 2 to 3-times the Ontario Sediment benchmark for lowest effect level (see Table 2). (No inorganic constituents, including manganese met observed release criteria.)

4.0 SITE SOURCES

Based on a review of the records, it appears that the multiple sources that once contributed to the release of contaminants to the slough from the south shore have been addressed. Information provided in Section 2 and in Appendix A of this report provides data regarding the potential sources, removal/remediation, and governmental involvement regarding each primary industry on the south shore of the slough.

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5.0 MIGRATION PATHWAYS

5.1 Groundwater

No groundwater samples were collected during the Site Inspection or previous investigations. The City of Rock Island obtains their drinking water from three surface water intakes, located upstream of the site. A review of an internal Oracle database maintained by the Illinois State Geological Survey identified groundwater wells located near the investigative area.

Locations of private water supply wells in relation to the site were analyzed using GIS. A total of four (4) private wells are located within one mile of the site (ISGS). Two of the wells were associated with companies that are no longer in operation in Rock Island and the facilities have been dismantled. The other two wells are located in residential areas where homes have been present since before the 1940s and the city has since provided public water supply. The groundwater flow direction in the area has been documented toward the river (north and northwest away from any potential targets) (Terracon, 2003; Terracon 2009). In consideration of these matters, the Groundwater Migration Pathway was not evaluated.

5.2 Surface Water

In consideration of the laboratory results for sediment samples, three samples (X204, X205, and X216) met observed release criteria for one or more analytes. Several pesticide compounds were detected in sediment samples X205 and X216 at concentrations that met observed release criteria. However, pesticides were not identified as contaminants of concern in the source material. The contaminants that met observed release criteria and are attributable to the site are 13 semivolatiles in sample X205, and one PCB compound in sample X204.

The in-water segment of the surface water route begins where the contaminants enter the Sylvan Slough and is designated as the Probable Point of Entry (PPE).

The PPE is identified by sediment sample X204. Sample X204 is located near where International Harvester once utilized several outfalls from the facility into the slough. From the PPE, surface water flows west within the slough for approximately 1.47 miles until it meets again with the main channel of the Mississippi River. From there the surface water flows west and south in the main channel of the Mississippi River. The 15-mile Target Distance Limit (TDL) is reached within the waters of the Mississippi River approximately 0.5 miles southeast of Montpelier, Iowa and the Clarks Ferry Recreation Area. Figure 4 of this report shows the 15-mile surface water route for the site.

The Sylvan Slough and the Mississippi River are both used as fisheries according to information obtained from Illinois Department of Natural Resources (Illinois DNR). According to data maintained by Illinois State Water Survey, there are no known surface water intakes used for drinking within the TDL of the surface water pathway (Illinois EPA, Oracle).

The National Wetlands Inventory Map was reviewed for areas surrounding the I & M Canal and Illinois River located within the 15-mile TDL for the surface water pathway. GIS was used to determine the length of various types of wetlands frontage that were adjacent to the Illinois River and I & M Canal. A total of 135,960 feet of wetlands frontage was identified within the 15-mile TDL (U.S. FWS). The majority of the wetlands along the 15-mile TDL are classified as Palustrine (dominated by persistent trees, shrubs, or emergent vegetation) (U.S. FWS). Figure 4 of this report displays the wetlands along the 15-mile surface water route for the site.

5.3 Soil Exposure

No soil samples were collected during the SI. Source material associated with releases to the slough has been remediated under the CERCLA removal/remedial program as well as under the oversight of the Illinois EPA Voluntary Site

Remediation Program. Historically, most areas where source material had been identified were beneath buildings or other structures eliminating the soil exposure pathway.

5.4 Air Route

No data were collected during previous investigations to support the air pathway.

6.0 SUMMARY

Sylvan Slough is located along a secondary channel of the Mississippi River as the river flows through the Quad Cities, in northwestern Illinois and eastern Iowa. The water in the secondary (southern) channel flows through two man-made dams around the south side of Sylvan Island and forms Sylvan Slough (Illinois EPA, 2003; USGS). The slough flows west for approximately two and a quarter miles where it re-joins the main channel of the Mississippi River (Illinois EPA, 2003; USGS). The Rock Island Arsenal located on Rock Island forms the northern boundary of the slough. A bicycle path and a number of active and closed facilities are located on the south side of the slough. Both the north and the south shores of the slough have been heavily developed.

Occasional releases of petroleum substances into the slough were documented back to the 1960s. Increased governmental scrutiny regarding the releases began in the 1990s when the releases became larger and more frequent. In February of 1993, the USCG responded to an oily sheen on the slough at locations greater than two miles downstream of a submerged 30” diameter outlet sewer that was releasing the material near IAISRR. Investigations conducted by various governmental entities identified five primary areas where oil/petroleum substances appeared to be entering the slough. The U.S. EPA began negotiations with property owners and industries in the area and two companies undertook an investigation and removal actions under the U.S. EPA’s CERCLA Removal Program. Other facilities in the area addressed their specific environmental issues primarily under Illinois EPA’s

Voluntary Site Remediation Program. The site was placed on CERCLIS in 2002 and in 2003, a CERCLA Preliminary Assessment recommended further sampling and analysis under a CERCLA Site Inspection (SI).

Illinois EPA began the SI in April 2010 and collected a total of 17 samples from the southern portion of the slough for laboratory analysis. Contaminant concentrations were compared to two background samples obtained upstream of the area of concern. In consideration of the laboratory results for sediment samples, three samples (X204, X205, and X216) met observed release criteria for one or more analytes. Sample X205 had the most compounds meeting observed release criteria: 13 semi-volatiles, and 10 pesticides while sample X216 and four pesticides and X204 had only one PCB compound meeting the criteria.

The surface water exposure pathway is the primary pathway of concern at the site. The Sylvan Slough and the Mississippi River are both considered fisheries and over 25 miles of wetland frontage is located along the flow pathway. However, the high dilution rates in the Mississippi River minimize the risk to human health and the environment.

In consideration of the removal and remediation efforts conducted at facilities on the south side of the slough, it is believed that source material no longer remains at the facilities of concern. No soil samples or groundwater samples were collected during the SI. The concern regarding surface soil exposures at the site is diminished by the presence of asphalt, concrete, and buildings located over source materials. In addition, the sub-surface nature of the contamination (source materials were largely released either from USTs or released directly to the slough via seeps or outfalls) reduces the risk of exposure to surface soils. Groundwater flow has been documented toward the slough and away from the few remaining water wells in Rock Island. Rock Island residents receive their drinking water from three surface water intakes located upstream of the site further minimizing the potential for exposures via the groundwater migration pathway. Similarly, the air pathway is not of concern at the site.

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Figures

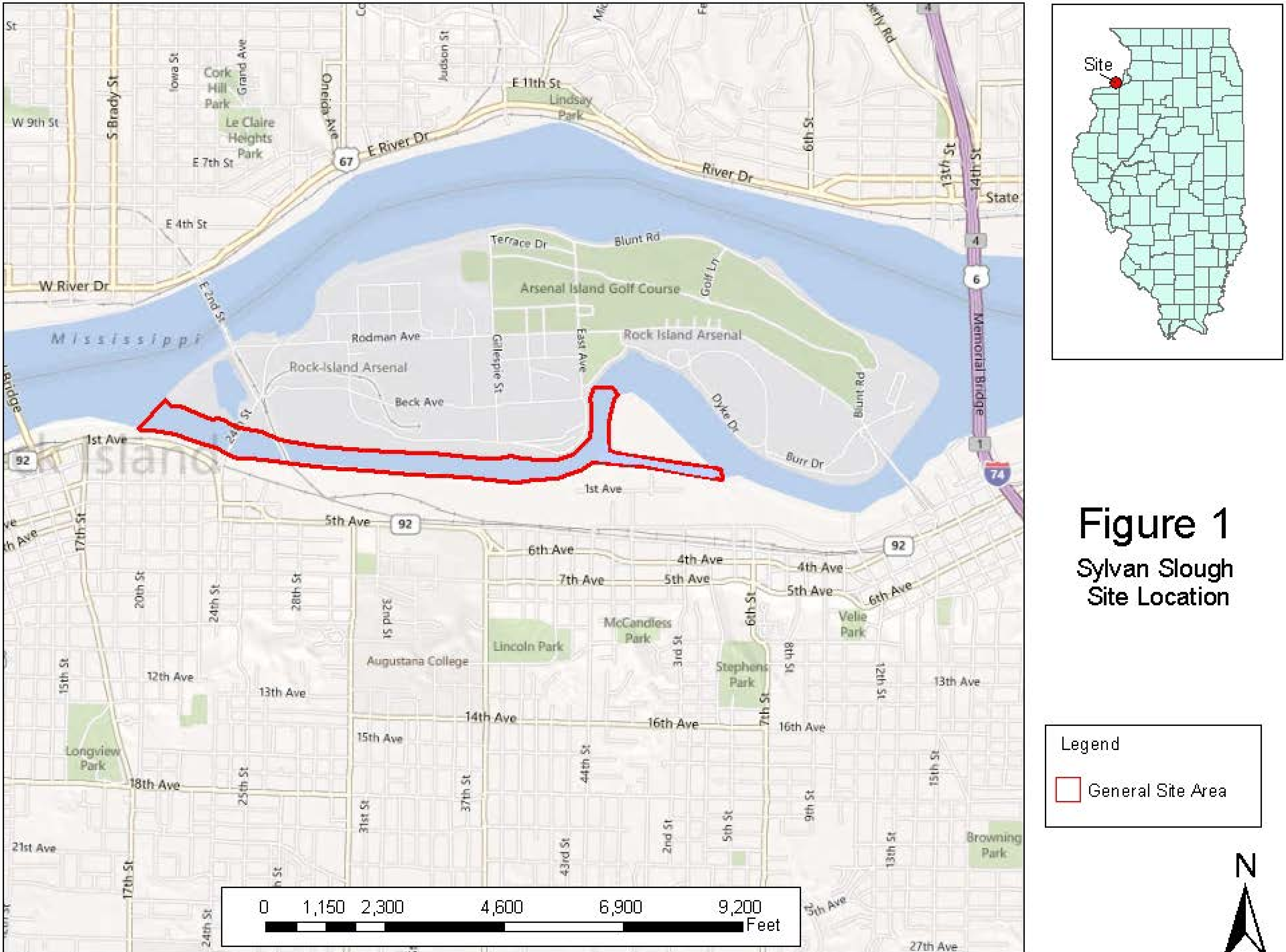
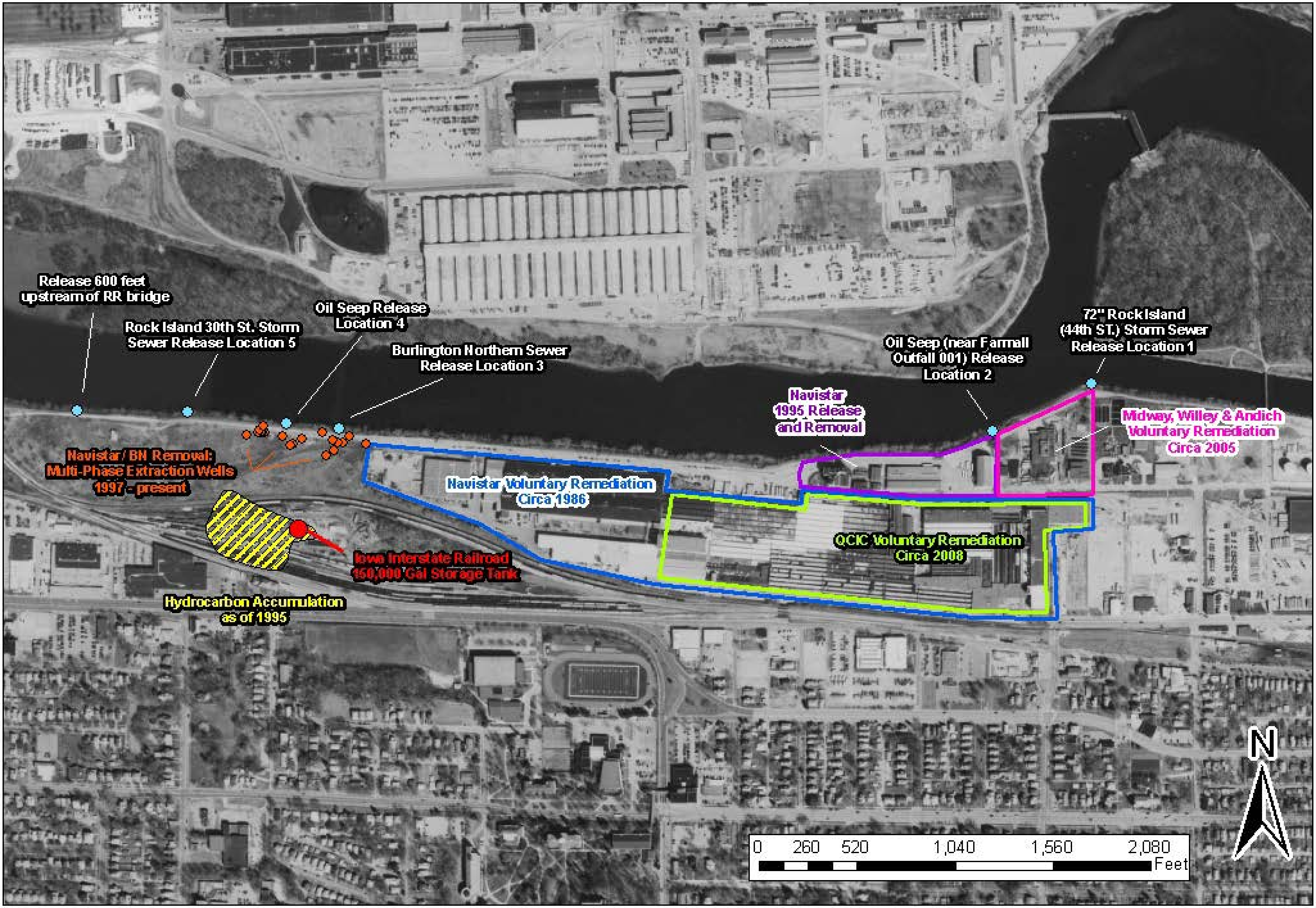


Figure 1
Sylvan Slough
Site Location

Figure 2
Sylvan Slough
Release Locations and Responses



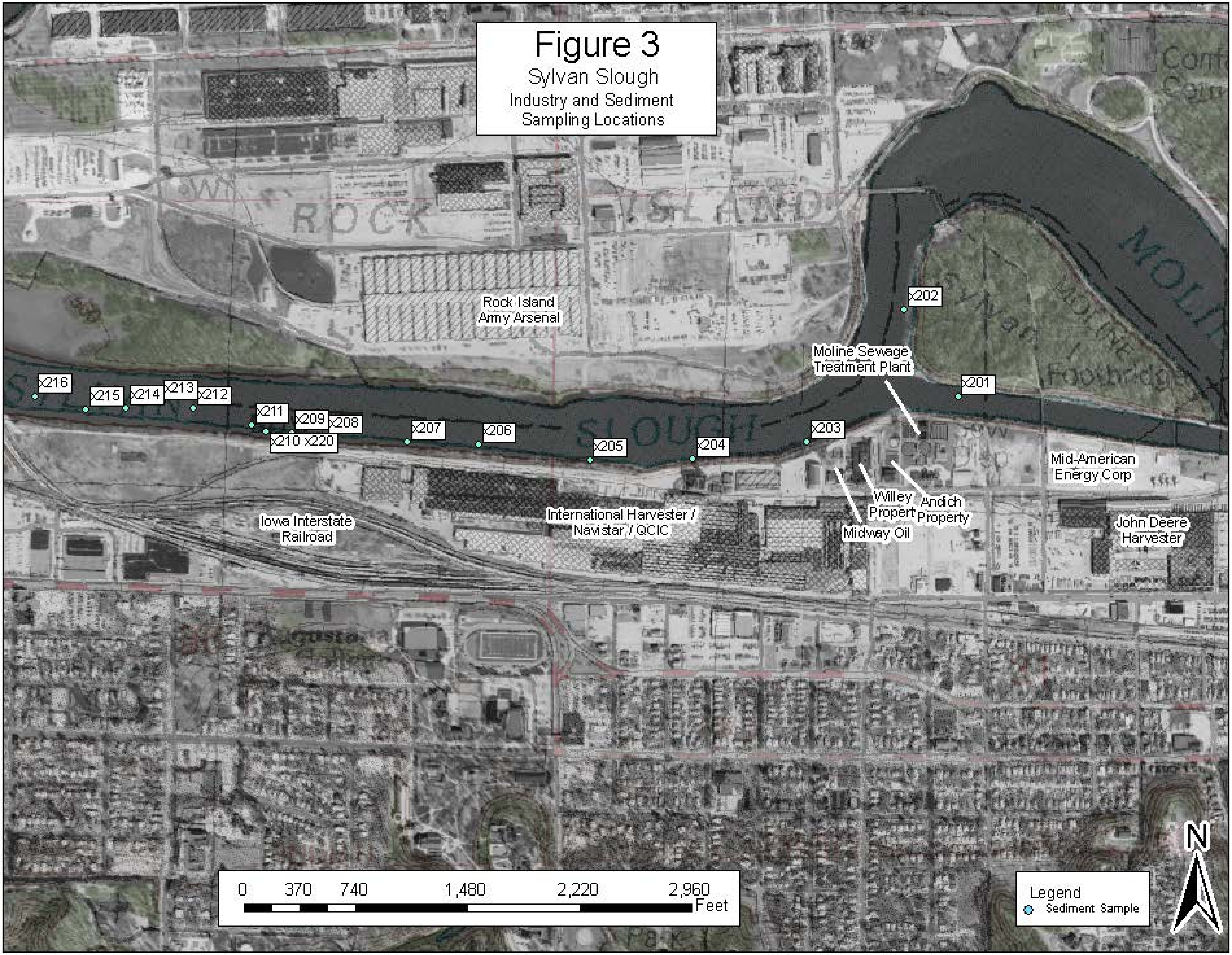


Figure 3
Sylvan Slough
Industry and Sediment
Sampling Locations
Rock Island
Army Arsenal
x202
Moline Sewage
Treatment Plant
x201
x216
x215
x214
x213
x212
x211
x209
x208
x210 x220
x207
x206
x205
x204
x203
Mid-American
Energy Corp
Willey
Propert
Andich
Property
Midway Oil
John Deere
Harvester
Iowa Interstate
Railroad
International Harvester /
Navistar / QCIC
0
370
740
1,480
2,220
2,960
Feet
Legend
Sediment Sample
N

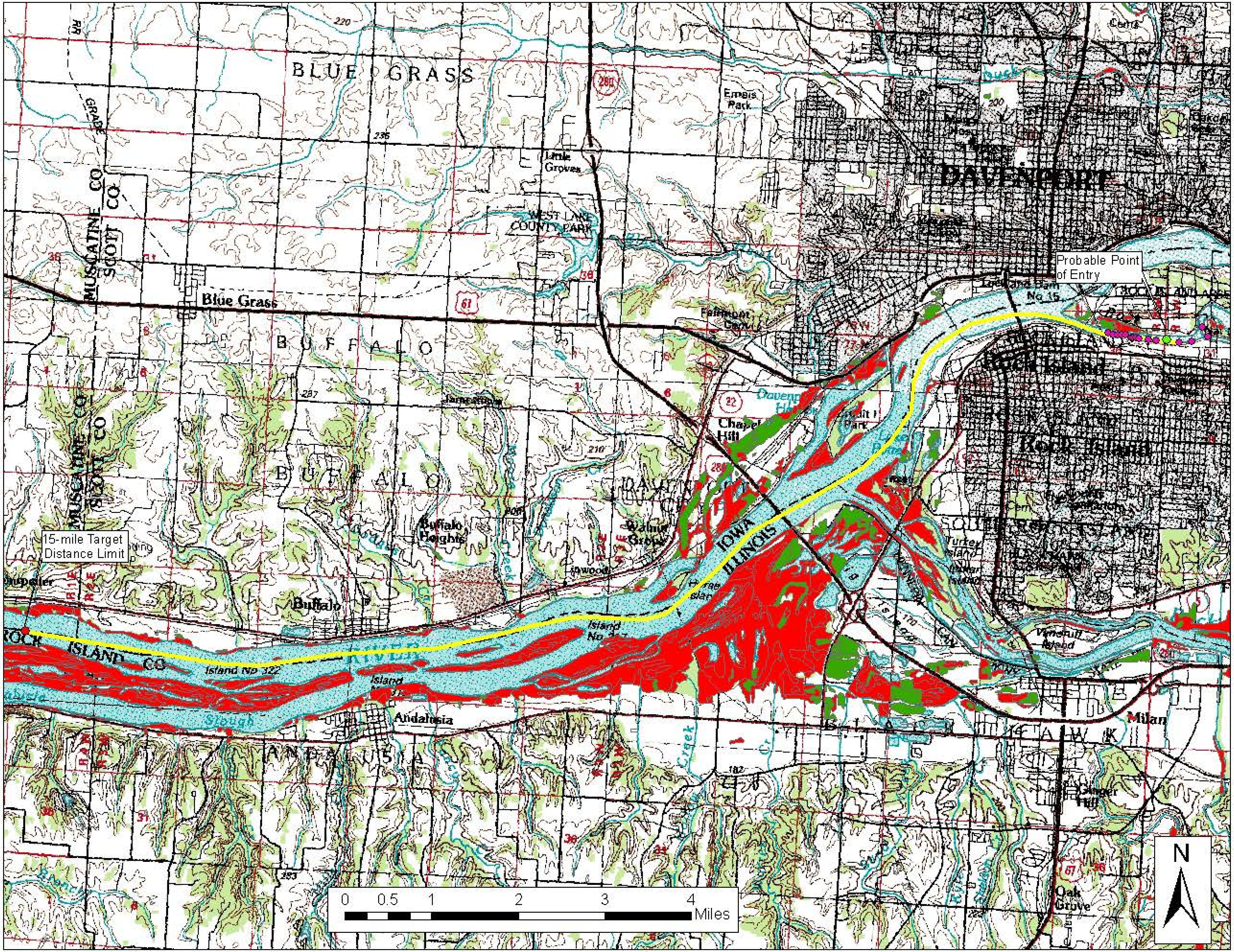


Figure 4

15-Mile Surface Water Map

Tables

Table 1
Sample Information

Sample	Type	Sample / Location Description	Analysis *
X201	Sediment	Considered background, collected upgradient of Farmall facility and sewage treatment plant, immediately north of Midway Oil Facility and approximately 115 feet north of south shore. Water depth at location is 18 feet. Sample X201 collected with a stainless steel Ponar Dredge on from **0 – 6”.** Sample time 1210.	TM, CN, VOC, SEMI, PEST/PCB
X202	Sediment	Considered background, collected upgradient of industries on south shore connected with oil releases. Sample X202 is north branch of the Slough as it passes around Sylvan Island and after it flows through the hydro-electric facility. Water depth at location is 18 feet. Sample X202 collected with a stainless steel Ponar Dredge on from **0 – 6” in fine brown silt with some sand.** Sample time 1155.	TM, CN, VOC, SEMI, PEST/PCB
X203	Sediment	Sample X203 was collected immediately north of eastern portion of former Farmall facility. Location is down gradient from oil seep location identified in early 1990s as well as Farmall’s Outfall #1. Sample collected approximately 35 feet north of the south shore of the slough. Water depth at location was 18 feet. Sample X203 collected with a stainless steel Ponar Dredge on from **0 – 6” in fine brown silt with small amount of sand.** Sample time 1135.	TM, CN, VOC, SEMI, PEST/PCB
X204	Sediment	Sample X204 was collected immediately north of central portion of former Farmall facility. Location is down gradient of two outfalls on south bank. (One of the outfalls is believed to be Outfall #3 from which Navistar had an oil release in 1995.) Sample collected approximately 17 feet north of the south shore of the slough. Water depth at location was 12 feet. Sample X204 collected with a stainless steel Ponar Dredge on from **0 – 6” in fine brown silt with small amount of gravel and brick shards.** Sample time 1100.	TM, CN, VOC, SEMI, PEST/PCB
X205	Sediment	Sample X205 was collected immediately north of central portion of former Farmall facility. Location is immediately down gradient of large outfall approximately 30 feet up bank. Sample collected approximately 47 feet north of the south shore of the slough. Water depth at location was 12 feet. Sample X205 collected with a stainless steel Ponar Dredge on from **0 – 6” in fine brown silt with small amount of gravel.** Sample time 1040.	TM, CN, VOC, SEMI, PEST/PCB
X206	Sediment	Sample X206 was collected immediately north of western portion of former Farmall facility. Galvanized approximately 18” diameter outfall in the bank at this location. Sample collected approximately 50 feet north of the south shore of the slough. Water depth at location was 18 – 20 feet. Sample X206 collected with a stainless steel Ponar Dredge on from **0 – 6” in fine brown silt.** Sample time 1030.	TM, CN, VOC, SEMI, PEST/PCB
X207	Sediment	Sample X207 was collected immediately north of western portion of former Farmall facility. Sample collected approximately 50 feet north of the south shore of the slough. Water depth at location was 18 – 20 feet. Sample X207 collected with a stainless steel Ponar Dredge on from **0 – 6” in fine brown silt.** Sample time 1010.	TM, CN, VOC, SEMI, PEST/PCB

Sample	Type	Sample / Location Description	Analysis *
X208	Sediment	Sample X208 was collected upstream of area where extraction wells were installed as a response to release from storm sewers and shore in 1993. Sample collected approximately 70 feet north of the south shore of the slough. Sample X208 collected with a stainless steel Ponar Dredge on from **0 – 6" in fine brown silt.** Sample time 1000.	TM, CN, VOC, SEMI, PEST/PCB
X209	Sediment	Location X209 was immediately north of extraction wells installed as a response to release from storm sewers and shore in 1993. Sample collected approximately 75 feet north of the south shore of the slough. Water depth at location was 18 feet. Sample X209 collected with a stainless steel Ponar Dredge on from **0 – 6" in fine brown silt.** Sample time 0950.	TM, CN, VOC, SEMI, PEST/PCB
X210	Sediment	Location X210 was immediately north of extraction wells installed as a response to release from storm sewers and shore in 1993. Sample collected approximately 67 feet north of the south shore of the slough. Water depth at location was 18 feet. Sample X210 collected with a stainless steel Ponar Dredge on from **0 – 6" in fine brown silt.** Sample time 0920.	TM, CN, VOC, SEMI, PEST/PCB
X220	Sediment	Duplicate of X210	TM, CN, VOC, SEMI, PEST/PCB
X211	Sediment	Location X211 was immediately north of extraction wells installed as a response to release from storm sewers and shore in 1993. Sample collected approximately 103 feet north of the south shore of the slough. Water depth at location was 16 – 17 feet. Sample X211 collected with a stainless steel Ponar Dredge on from **0 – 6" in fine brown silt.** Sample time was 1700.	TM, CN, VOC, SEMI, PEST/PCB
X212	Sediment	Location X212 was immediately north of general area of vacant land owned by Navistar had oil seeps into the slough. Sample collected approximately 165 feet north of the south shore of the slough. Water depth at location was 18 – 20 feet. Sample X212 collected with a stainless steel Ponar Dredge on from **0 – 6" in fine brown silt.** Zebra mussels present in sediment. Sample time was 1650.	TM, CN, VOC, SEMI, PEST/PCB
X213	Sediment	Location X213 was immediately north of general area of vacant land owned by Navistar had oil seeps into the slough. Sample collected approximately 200 feet north of the south shore of the slough. Water depth at location was 18 – 20 feet. Sample X213 collected with a stainless steel Ponar Dredge on from **0 – 6" in fine brown silt with trace small gravel.** Sample time was 1635.	TM, CN, VOC, SEMI, PEST/PCB
X214	Sediment	Location X214 was immediately north of general area of vacant land owned by Navistar had oil seeps into the slough. Sample collected approximately 138 feet north of the south shore of the slough. Water depth at location was 18 – 20 feet. Sample X214 collected with a stainless steel Ponar Dredge on from **0 – 6" in fine brown silt with trace small gravel.** Sample time was 1625.	TM, VOC, SEMI, PEST/PCB

Sample	Type	Sample / Location Description	Analysis *
X215	Sediment	Location X215 was immediately north of general area of vacant land owned by Navistar had oil seeps into the slough. Sample collected approximately 125 feet north of the south shore of the slough. Water depth at location was 18 – 20 feet. Sample X215 collected with a stainless steel Ponar Dredge on from **0 – 6” in fine brown silt.** Sample time was 1610.	TM, CN, VOC, SEMI, PEST/PCB
X216	Sediment	Farthest Downstream location, approximately 280 feet up gradient of railroad bridge. Sample collected approximately 150 feet north of the south shore of the Sylvan Slough. Water depth at location was 18 – 20 feet. Sample X216 collected with a stainless steel Ponar Dredge on from **0 – 6” in fine brown silt with some small gravel**. Sample time was 1550.	TM, CN, VOC, SEMI, PEST/PCB

* TM - Total Metals
CN - Cyanide
VOC - Volatile Organic Compounds
SEMI – Semi-volatile Organic Compounds
PEST/PCB – Pesticides and Polychlorinated Biphenol Compounds

TABLE 2
Sylvan Slough
Sediment Samples
TCL Metals Analysis Results in mg/Kg

Sampling Location : Matrix : Units :	Ontario Sediment Benchark for Lowest Effect Level [1]	United States EPA Ecotox Thresholds or ARCS Effect Concentrations [2]	Background [3] Soil mg/Kg		X201 Soil mg/Kg		X202 Soil mg/Kg		X203 Soil mg/Kg		X204 Soil mg/Kg		X205 Soil mg/Kg		X206 Soil mg/Kg	
ANALYTE			Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	NA [4]	58030 PEC	6320		6320		4310		6220		6530		6080		6740	
ANTIMONY	NA	NA	11.8	UJ	11.8	UJ	9.7	UJ	12.2	UJ	13.0	UJ	11.7	UJ	11.9	UJ
ARSENIC	6	8.2	3.8		3.8		2.7		4.0		4.2		4.2		3.8	
BARIUM	NA	NA	115		115		81.0		111		115		115		119	
BERYLLIUM	NA	NA	0.99	U	0.99	U	0.81	U	1.0	U	1.1	U	0.97	U	0.99	U
CADMIUM	0.6	1.2	0.99	U	0.99	U	0.81	U	1.0	U	1.1	U	0.97	U	0.99	U
CALCIUM	NA	NA	13300		13300		10700		13900		13600		11400		12600	
CHROMIUM	26	81	10.9		10.9		8.1		11.3		11.3		11.1		11.3	
COBALT	NA	NA	9.9	U	9.9	U	8.1	U	10.2	U	10.8	U	9.7	U	9.9	U
COPPER	16	34	12.2		12.2		8.2		12.8		13.1		14.4		12.3	
CYANIDE	NA	NA	5.0	UJ	5.0	UJ	4.0	UJ	5.1	UJ	5.3	UJ	4.9	UJ	5.0	UJ
IRON	20000	NA	13200		13200		9760		13600		13600		13300		13600	
LEAD	31	47	15.2	J	15.2	J	10.6	J	17.8	J	15.9	J	17.4	J	15.1	J
MAGNESIUM	NA	NA	4860		4860		4000		4840		4700		3790		4620	
MANGANESE	460	NA	**1210**		**1210**		**828**		**1170**		**1160**		**1030**		**1200**	
MERCURY	0.2	0.15	0.20	U	0.20	U	0.16	U	0.21	U	0.21	U	0.20	U	0.20	U
NICKEL	16	21	11.8		11.8		8.3		11.9		12.1		11.5		12.1	
POTASSIUM	NA	NA	645	J-	645	J-	409	J-	611	J-	675	J-	615	J-	683	J
SELENIUM	NA	NA	6.9	U	6.9	U	5.7	U	7.1	U	0.38	J	6.8	U	6.9	U
SILVER	NA	NA	2.0	U	2.0	U	1.6	U	2.0	U	2.2	U	1.9	U	2.0	U
SODIUM	NA	NA	986	U	986	U	809	U	1020	U	1080	U	975	U	992	U
THALLIUM	NA	NA	4.9	U	4.9	U	4.0	U	5.1	U	0.073	J-	4.9	U	5.0	U
VANADIUM	NA	NA	16.0		16.0		12.0		15.7		16.5		15.4		16.5	
ZINC	120	150	67.0		67.0		44.2		72.9		70.6		83.1		67.6	

NOTES:

1 Ontario Ministry of Environment Sediment Screening Level for Lowest Effect Level

2 U.S. EPA Office of Solid Waste and Emergency Response Sediment Ecotox Thresholds (ET). In cases where no ET is available, USEPA Effect Concentrations developed under ARCS program is provided. ARCS benchmarks identified with either TEC = Threshold Effect Concentration or PEC = Probable Effect Concentration.

3 Background concentration is greatest concentration in either X201 or X202

4 NA - No Benchmark Exits for Analyte

3 **1210** Indicates concentration above benchmark

3 J Indicates concentration is estimated

4 U Indicates analyte undetected by lab equipment

5 UJ The analyte was analyzed for, but not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

TABLE 2
Sylvan Slough
Sediment Samples
TCL Metals Analysis Results in mg/Kg

Sampling Location : Matrix : Units :	Ontario Sediment Benchark for Lowest Effect Level [1]	United States EPA Ecotox Thresholds or ARCS Effect Concentrations [2]	X207 Soil mg/Kg		X208 Soil mg/Kg		X209 Soil mg/Kg		X210 Soil mg/Kg		X211 Soil mg/Kg		X212 Soil mg/Kg		X214 Soil mg/Kg	
ANALYTE					Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	NA [4]	58030 PEC	5970		6690		7720		7220		6940		7520		7770	
ANTIMONY	NA	NA	11.5	UJ	13.7	UJ	13.4	UJ	12.8	UJ	12.0	UJ	13.2	UJ	13.5	UJ
ARSENIC	6	8.2	3.5		4.1		4.7		4.3		4.1		4.8		5.0	
BARIUM	NA	NA	103		117		133		125		122		135		141	
BERYLLIUM	NA	NA	0.96	U	1.1	U	1.1	U	1.1	U	1.0	U	1.1	U	1.1	U
CADMIUM	0.6	1.2	0.96	U	1.1	U	1.1	U	1.1	U	1.0	U	1.1	U	1.1	U
CALCIUM	NA	NA	10900		10800		12800		11500		12800		12900		13400	
CHROMIUM	26	81	10.2		11.6		12.9		12.1		11.8		12.7		13.0	
COBALT	NA	NA	9.6	U	11.4	U	11.1	U	10.7	U	10.0	U	11.0	U	11.3	U
COPPER	16	34	11.1		12.8		14.3		13.4		12.4		13.9		14.0	
CYANIDE	NA	NA	4.8	UJ	5.7	UJ	5.6	UJ	5.3	UJ	5.0	UJ	5.5	UJ	5.6	UJ
IRON	20000	NA	12100		14000		15900		14600		14200		15600		16000	
LEAD	31	47	13.2	J	15.1	J	17.1	J	15.9	J	15.0	J	17.2	J	17.5	J
MAGNESIUM	NA	NA	4070		3960		4800		4290		4830		4700		4830	
MANGANESE	460	NA	**1040**		**1230**		**1380**		**1270**		**1250**		**1400**		**1480**	
MERCURY	0.2	0.15	0.19	U	0.23	U	0.22	U	0.20	U	0.20	U	0.22	U	0.23	U
NICKEL	16	21	10.7		12.1		13.7		12.8		12.5		13.6		14.1	
POTASSIUM	NA	NA	962	U	1140	U	1110	U	1070	U	710	J	753	J	783	J
SELENIUM	NA	NA	6.7	U	8.0	U	7.8	U	7.5	U	7.0	U	0.44	J	7.9	U
SILVER	NA	NA	1.9	U	2.3	U	2.2	U	2.1	U	2.0	U	2.2	U	2.3	U
SODIUM	NA	NA	962	U	1140	U	1110	U	1070	U	1000	U	1100	U	1130	U
THALLIUM	NA	NA	4.8	U	0.091	J-	5.6	U	5.3	U	5.0	U	5.5	U	5.6	U
VANADIUM	NA	NA	14.9		17.1		19.2		17.9		17.3		18.7		19.5	
ZINC	120	150	60.1		66.5		77.5		71.8		69.6		76.6		80.1	

NOTES:
1 Ontario Ministry of Environment Sediment Screening Level for Lowest Effect Level
2 U.S. EPA Office of Solid Waste and Emergency Response Sediment Ecotox Thresholds (ET). In cases where no ET is available, USEPA Effect Concentrations developed under ARCS program is provided. ARCS benchmarks identified with either TEC = Threshold Effect Concentration or PEC = Probable Effect Concentration.
3 Background concentration is greatest concentration in either X201 or X202
4 NA - No Benchmark Exits for Analyte
3 **1200** Indicates concentration above benchmark
3 J Indicates concentration is estimated
4 U Indicates analyte undetected by lab equipment
5 UJ The analyte was analyzed for, but not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

TABLE 2
Sylvan Slough
Sediment Samples
TCL Metals Analysis Results in mg/Kg

Sampling Location : Matrix : Units :	Ontario Sediment Benchark for Lowest Effect Level [1]	United States EPA Ecotox Thresholds or ARCS Effect Concentrations [2]	X215 Soil mg/Kg		X216 Soil mg/Kg	
ANALYTE			Result	Flag	Result	Flag
ALUMINUM	NA [4]	58030 PEC	7540		7280	
ANTIMONY	NA	NA	12.6	UJ	13.2	UJ
ARSENIC	6	8.2	4.7		4.4	
BARIUM	NA	NA	130		131	
BERYLLIUM	NA	NA	1.0	U	1.1	U
CADMIUM	0.6	1.2	1.0	U	1.1	U
CALCIUM	NA	NA	12900		14300	
CHROMIUM	26	81	12.4		12.2	
COBALT	NA	NA	10.5	U	11.0	U
COPPER	16	34	13.3		13.3	
CYANIDE	NA	NA	5.2	UJ	5.5	UJ
IRON	20000	NA	15200		15100	
LEAD	31	47	16.7	J	16.9	J
MAGNESIUM	NA	NA	4790		5480	
MANGANESE	460	NA	**1350**		**1380**	
MERCURY	0.2	0.15	0.21	U	0.21	U
NICKEL	16	21	13.6		13.2	
POTASSIUM	NA	NA	755	J	734	J-
SELENIUM	NA	NA	7.3	U	7.7	U
SILVER	NA	NA	2.1	U	2.2	U
SODIUM	NA	NA	1050	U	1100	U
THALLIUM	NA	NA	5.2	U	5.5	U
VANADIUM	NA	NA	18.4		18.4	
ZINC	120	150	75.8		74.9	

NOTES:
1 Ontario Ministry of Environment Sediment Screening Level for Lowest Effect Level
2 U.S. EPA Office of Solid Waste and Emergency Response Sediment Ecotox Thresholds (ET). In cases where no ET is available, USEPA Effect Concentrations developed under ARCS program is provided. ARCS benchmarks identified with either TEC = Threshold Effect Concentration or PEC = Probable Effect Concentration.
3 Background concentration is greatest concentration in either X201 or X202
4 NA - No Benchmark Exits for Analyte

3	**1200**	Indicates concentration above benchmark
3	J	Indicates concentration is estimated
4	U	Indicates analyte undetected by lab equipment
5	UJ	The analyte was analyzed for, but not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

TABLE 3
Sylvan Slough
Sediment Analytical Results
Volatile Organic Compounds (ug/Kg)

Organic Compound	Ontario Sediment Benchark for Lowest Effect Level [1]	United States EPA Ecotox Thresholds or ARCS Effect Concentrations 2	Background [3] Sediment ug/Kg		X201 Sediment ug/Kg		X202 Sediment ug/Kg		X203 Sediment ug/Kg		X204 Sediment ug/Kg		X205 Sediment ug/Kg		X206 Sediment ug/Kg		X207 Sediment ug/Kg	
			Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
1,1,1-Trichloroethane	NA	170	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	U	10	U	10	U
1,1,2,2-Tetrachloroethane	NA	940	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	U	10	U	10	U
1,1,2-Trichloro-1,2,2-trifluoro	NA	NA	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	U	10	U	10	U
1,1,2-Trichloroethane	NA	NA	9.8	UJ	9.8	UJ	7.8	U	9.3	U	11	U	9.3	UJ	10	UJ	10	UJ
1,1-Dichloroethane	NA	NA	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	U	10	U	10	U
1,1-Dichloroethene	NA	NA	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	U	10	U	10	U
1,2,3-Trichlorobenzene	NA	NA	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	UJ	10	U	10	UJ
1,2,4-Trichlorobenzene	NA	9200	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	UJ	10	U	10	UJ
1,2-Dibromo-3-chloropropane	NA	NA	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	U	10	U	10	U
1,2-Dibromoethane (EDB)	NA	NA	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	U	10	U	10	U
1,2-Dichlorobenzene	NA	340	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	UJ	10	U	10	UJ
1,2-Dichloroethane	NA	NA	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	U	10	U	10	U
1,2-Dichloropropane	NA	NA	9.8	UJ	9.8	UJ	7.8	U	9.3	U	11	U	9.3	U	10	U	10	UJ
1,3-Dichlorobenzene	NA	1700	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	UJ	10	U	10	UJ
1,4-Dichlorobenzene	NA	350	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	UJ	10	U	10	UJ
1,4-Dioxane			200	R	200	R	160	R	190	R	220	R	190	R	210	R	200	R
2-Butanone (MEK)	NA	NA	20	U	20	U	16	U	19	U	22	U	19	U	21	U	20	U
2-Hexanone	NA	NA	20	U	20	U	16	U	19	U	22	U	19	U	21	U	20	U
4-Methyl-2-pentanone (MIBK)	NA	NA	20	U	20	U	16	U	19	U	22	U	19	U	21	U	20	U
Acetone	NA	NA	26		20	U	26		10	J	26		8.8	J	13	J	8.5	J
Benzene	NA	57	9.8	UJ	9.8	UJ	7.8	U	9.3	UJ	11	U	9.3	UJ	10	UJ	10	UJ
Bromochloromethane	NA	NA	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	U	10	U	10	U
Bromodichloromethane	NA	NA	9.8	UJ	9.8	UJ	7.8	U	9.3	U	11	U	9.3	U	10	U	10	UJ
Bromoform	NA	NA	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	U	10	U	10	U
Bromomethane	NA	NA	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	U	10	U	10	U
Carbon Disulfide	NA	NA	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	U	10	U	10	U
Carbon Tetrachloride	NA	NA	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	U	10	U	10	U
Chlorobenzene	NA	820	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	UJ	10	U	10	UJ
Chloroethane	NA	NA	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	U	10	U	10	U
Chloroform	NA	NA	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	U	10	U	10	U
Chloromethane	NA	NA	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	U	10	U	10	U
cis-1,2-Dichloroethene	NA	NA	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	U	10	U	10	U
cis-1,3-Dichloropropene	NA	NA	9.8	UJ	9.8	UJ	7.8	U	9.3	U	11	U	9.3	UJ	10	UJ	10	UJ
cyclohexane	NA	NA	9.8	UJ	9.8	UJ	7.8	U	9.3	U	11	U	9.3	U	10	U	10	UJ
Dibromochloromethane	NA	NA	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	U	10	U	10	U
Dichlorodifluoromethane	NA	NA	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	U	10	U	10	U
Ethylbenzene	NA	3600	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	U	10	U	10	UJ
Isopropylbenzene	NA	NA	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	U	10	U	10	UJ
m,p-xylene	NA	NA	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	U	10	U	10	UJ
Methyl acetate	NA	NA	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	U	10	U	10	U
Methyl-tert-butyl-ether (MTBE	NA	NA	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	U	10	U	10	U
Methylcyclohexane	NA	NA	9.8	UJ	9.8	UJ	7.8	U	9.3	U	11	U	9.3	U	10	U	10	UJ
Methylene chloride	NA	NA	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	U	10	U	10	U
o-xylene	NA	NA	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	U	10	U	10	UJ
Styrene	NA	NA	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	U	10	U	10	UJ
Tetrachloroethene	NA	530	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	U	10	U	10	UJ
Toluene	NA	670	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	U	10	U	10	UJ
trans-1,2-Dichloroethene	NA	NA	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	U	10	U	10	U
trans-1,3-Dichloropropene	NA	NA	9.8	UJ	9.8	UJ	7.8	U	9.3	U	11	U	9.3	UJ	10	UJ	10	UJ
Trichloroethene	NA	1600	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	U	10	U	10	UJ
Trichlorofluoromethane	NA	NA	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	U	10	U	10	U
Vinyl Chloride	NA	NA	9.8	U	9.8	U	7.8	U	9.3	U	11	U	9.3	U	10	U	10	U

NOTES:
1 Ontario Ministry of Environment Sediment Screening Level for Lowest Effect Level
2 U.S. EPA Office of Solid Waste and Emergency Response Sediment Ecotox Thresholds (ET). In cases where no ET is available, USEPA Effect Concentrations developed under ARCS program is provided. ARCS benchmarks identified with either TEC = Threshold Effect Concentration or PEC = Probable Effect Concentration.
3 Background is the greatest concentration identified in either X201 or X202
4 NA - Indicates no benchmark identified for compound
5 U Indicates analyte not detected at or above stated limit
6 J Result is an estimated value
7 UJ Result was analyzed for, but not detected at concentrations above the approximate sample quantitation limit
8 R Data is unusable

TABLE 3
Sylvan Slough
Sediment Analytical Results
Volatile Organic Compounds (ug/Kg)

Organic Compound	Ontario Sediment Benchark for Lowest Effect Level [1]	United States EPA Ecotox Thresholds or ARCS Effect Concentrations 2	208 Sediment ug/Kg		209 Sediment ug/Kg		210 Sediment ug/Kg		211 Sediment ug/Kg		212 Sediment ug/Kg		213 Sediment ug/Kg		214 Sediment ug/Kg		215 Sediment ug/Kg		216 Sediment ug/Kg	
			Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
1,1,1-Trichloroethane	NA	170	11	UJ	11	U	12	U	11	U	11	UJ	10	U	11	U	11	U	11	U
1,1,2,2-Tetrachloroethane	NA	940	11	U	11	U	12	U	11	U	11	UJ	10	U	11	U	11	U	11	U
1,1,2-Trichloro-1,2,2-trifluoro	NA	NA	11	UJ	11	U	12	U	11	U	11	UJ	10	U	11	U	11	U	11	U
1,1,2-Trichloroethane	NA	NA	11	UJ	11	UJ	12	UJ	11	U	11	UJ	10	U	11	U	11	U	11	U
1,1-Dichloroethane	NA	NA	11	U	11	U	12	U	11	U	11	UJ	10	U	11	U	11	U	11	U
1,1-Dichloroethene	NA	NA	11	U	11	U	12	U	11	U	11	UJ	10	U	11	U	11	U	11	U
1,2,3-Trichlorobenzene	NA	NA	11	UJ	11	UJ	12	UJ	11	U	11	UJ	10	U	11	U	11	U	11	U
1,2,4-Trichlorobenzene	NA	9200	11	UJ	11	UJ	12	UJ	11	U	11	UJ	10	U	11	U	11	U	11	U
1,2-Dibromo-3-chloropropane	NA	NA	11	U	11	U	12	U	11	U	11	UJ	10	U	11	U	11	U	11	U
1,2-Dibromoethane (EDB)	NA	NA	11	UJ	11	U	12	U	11	U	11	UJ	10	U	11	U	11	U	11	U
1,2-Dichlorobenzene	NA	340	11	UJ	11	UJ	12	UJ	11	U	11	UJ	10	U	11	U	11	U	11	U
1,2-Dichloroethane	NA	NA	11	UJ	11	U	12	U	11	U	11	UJ	10	U	11	U	11	U	11	U
1,2-Dichloropropane	NA	NA	11	UJ	11	UJ	12	UJ	11	U	11	UJ	10	U	11	U	11	U	11	U
1,3-Dichlorobenzene	NA	1700	11	UJ	11	UJ	12	UJ	11	U	11	UJ	10	U	11	U	11	U	11	U
1,4-Dichlorobenzene	NA	350	11	UJ	11	UJ	12	UJ	11	U	11	UJ	10	U	11	U	11	U	11	U
1,4-Dioxane			230	R	230	R	240	R	210	R	220	R	200	R	220	R	220	R	230	R
2-Butanone (MEK)	NA	NA	23	R	23	U	24	U	21	U	22	UJ	20	U	22	U	22	U	23	U
2-Hexanone	NA	NA	23	U	23	U	24	U	21	U	22	UJ	20	U	22	U	22	U	23	U
4-Methyl-2-pentanone (MIBK)	NA	NA	23	U	23	U	24	U	21	U	22	UJ	20	U	22	U	22	U	23	U
Acetone	NA	NA	10	J	7.6	J	15	J	23		18	J	9.5	J	23		17	J	15	J
Benzene	NA	57	11	UJ	11	UJ	12	UJ	11	UJ	11	UJ	10	U	11	U	11	U	11	U
Bromochloromethane	NA	NA	11	U	11	U	12	U	11	U	11	UJ	10	U	11	U	11	U	11	U
Bromodichloromethane	NA	NA	11	UJ	11	U	12	UJ	11	U	11	UJ	10	U	11	U	11	U	11	U
Bromoform	NA	NA	11	U	11	U	12	U	11	U	11	UJ	10	U	11	U	11	U	11	U
Bromomethane	NA	NA	11	U	11	U	12	U	11	U	11	UJ	10	U	11	U	11	U	11	U
Carbon Disulfide	NA	NA	11	U	11	U	12	U	11	U	11	UJ	10	U	11	U	11	U	11	U
Carbon Tetrachloride	NA	NA	11	UJ	11	U	12	U	11	U	11	UJ	10	U	11	U	11	U	11	U
Chlorobenzene	NA	820	11	UJ	11	UJ	12	UJ	11	U	11	UJ	10	U	11	U	11	U	11	U
Chloroethane	NA	NA	11	U	11	U	12	U	11	U	11	UJ	10	U	11	U	11	U	11	U
Chloroform	NA	NA	11	U	11	U	12	U	11	U	11	UJ	10	U	11	U	11	U	11	U
Chloromethane	NA	NA	11	U	11	U	12	U	11	U	11	UJ	10	U	11	U	11	U	11	U
cis-1,2-Dichloroethene	NA	NA	11	U	11	U	12	U	11	U	11	UJ	10	U	11	U	11	U	11	U
cis-1,3-Dichloropropene	NA	NA	11	UJ	11	UJ	12	U	11	U	11	UJ	10	U	11	U	11	U	11	U
cyclohexane	NA	NA	11	UJ	11	U	12	UJ	11	U	11	UJ	10	U	11	U	11	U	11	U
Dibromochloromethane	NA	NA	11	U	11	U	12	U	11	U	11	UJ	10	U	11	U	11	U	11	U
Dichlorodifluoromethane	NA	NA	11	U	11	U	12	U	11	U	11	UJ	10	U	11	U	11	U	11	U
Ethylbenzene	NA	3600	11	UJ	11	U	12	UJ	11	U	11	UJ	10	U	11	U	11	U	11	U
Isopropylbenzene	NA	NA	11	UJ	11	U	12	UJ	11	U	11	UJ	10	U	11	U	11	U	11	U
m,p-xylene	NA	NA	11	UJ	11	U	12	UJ	11	U	11	UJ	10	U	11	U	11	U	11	U
Methyl acetate	NA	NA	11	UJ	11	U	12	U	11	U	11	UJ	1.8	J	11	U	11	U	11	U
Methyl-tert-butyl-ether (MTBE	NA	NA	11	UJ	11	U	12	U	11	U	11	UJ	10	U	11	U	11	U	11	U
Methylcyclohexane	NA	NA	11	UJ	11	U	12	UJ	11	U	11	UJ	10	U	11	U	11	U	11	U
Methylene chloride	NA	NA	11	UJ	11	U	12	U	11	U	11	UJ	10	U	11	U	11	U	11	U
o-xylene	NA	NA	11	UJ	11	U	12	UJ	11	U	11	UJ	10	U	11	U	11	U	11	U
Styrene	NA	NA	11	UJ	11	U	12	UJ	11	U	11	UJ	10	U	11	U	11	U	11	U
Tetrachloroethene	NA	530	11	UJ	11	U	12	UJ	11	U	11	UJ	10	U	11	U	11	U	11	U
Toluene	NA	670	11	UJ	11	U	3	J	11	U	11	UJ	10	U	11	U	11	U	11	U
trans-1,2-Dichloroethene	NA	NA	11	U	11	U	12	U	11	U	11	UJ	10	U	11	U	11	U	11	U
trans-1,3-Dichloropropene	NA	NA	11	UJ	11	UJ	12	UJ	11	U	11	UJ	10	U	11	U	11	U	11	U
Trichloroethene	NA	1600	11	UJ	11	U	12	UJ	11	U	11	UJ	10	U	11	U	11	U	11	U
Trichlorofluoromethane	NA	NA	11	UJ	11	U	12	U	11	U	11	UJ	10	U	11	U	11	U	11	U
Vinyl Chloride	NA	NA	11	UJ	11	U	12	U	11	U	11	UJ	10	U	11	U	11	U	11	U

NOTES:
1 Ontario Ministry of Environment Sediment Screening Level for Lowest Effect Level
2 U.S. EPA Office of Solid Waste and Emergency Response Sediment Ecotox Thresholds (ET). In cases where no ET is available, USEPA Effect Concentrations developed under ARCS program is provided. ARCS benchmarks identified with either TEC = Threshold Effect Concentration or PEC = Probable Effect Concentration.
3 Background is the greatest concentration identified in either X201 or X202
4 NA - Indicates no benchmark identified for compound
5 U Indicates analyte not detected at or above stated limit
6 J Result is an estimated value
7 UJ Result was analyzed for, but not detected at concentrations above the approximate sample quantitation limit
8 R Data is unusable

TABLE 4
Sylvan Slough
Sediment Analytical Results
Semi-volatile Organic Compounds (ug/Kg)

	Ontario Sediment Benchark for Lowest Effect Level [1,3]	United States EPA Ecotox Thresholds or ARCS Effect Concentrations [2,3]	Background [4] Sediment ug/Kg		X201 Sediment ug/Kg		X202 Sediment ug/Kg		X203 Sediment ug/Kg		X204 Sediment ug/Kg		X205 Sediment ug/Kg		X206 Sediment ug/Kg	
Volatile Compound			Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
1,1'-Biphenyl	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
1,2,4,5-Tetrachlorobenzene	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
2,2-oxybis (1-chloropropane)	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
2,3,4,6-Tetrachlorophenol	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
2,4,5-Trichlorophenol	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
2,4,6-Trichlorophenol	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
2,4-Dichlorophenol	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
2,4-Dimethylphenol	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
2,4-Dinitrophenol	NA	NA	650	U	650	U	520	U	610	U	720	U	610	U	690	U
2,4-Dinitrotoluene	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
2,6-Dinitrotoluene	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
2-Chloronaphthalene	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
2-Chlorophenol	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
2-Methylnaphthalene	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
2-Methylphenol (o-cresol)	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
2-Nitroaniline	NA	NA	650	U	650	U	520	U	610	U	720	U	610	U	690	U
2-Nitrophenol	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
3,3-Dichlorobenzene	NA	NA	330	U	330	U	270	U	310	U	370	UJ	310	UJ	350	UJ
3-Nitroaniline	NA	NA	650	U	650	U	520	U	610	U	720	U	610	U	690	U
4,6 Dinitro 2-methylphenol	NA	NA	650	U	650	U	520	U	610	U	720	U	610	U	690	U
4-Bromophenyl phenyl ether	NA	1300	330	U	330	U	270	U	310	U	370	U	310	U	350	U
4-Chloro-3-methylphenol	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
4-Chloroaniline	NA	NA	330	U	330	U	270	U	310	U	370	UJ	310	UJ	350	UJ
4-Chlorophenyl phenyl ether	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
4-Methylphenol (m/p-cresol)	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
4-Nitroaniline	NA	NA	650	U	650	U	520	U	610	U	720	U	610	U	690	U
4-Nitrophenol	NA	NA	650	U	650	U	520	U	610	U	720	U	610	U	690	U
Acenaphthene	NA	620	330	U	330	U	270	U	310	U	370	U	280	J	350	U
Acenaphthylene	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
Acetophenone	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
Anthracene	220	31.62	330	U	330	U	270	U	310	U	370	U	**440**		350	U
Atrazine	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
Benzaldehyde	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
Benzo(a)anthracene	320	NA	330	U	330	U	77	J	310	U	69	J	**1600**		350	U
Benzo(a)pyrene	370	0.43	330	U	330	U	66	J	310	U	79	J	**1400**		350	U
Benzo(b)fluoranthene	NA	NA	330	U	330	U	82	J	310	U	370	U	**2000**		350	U
Benzo(g,h,i)perylene	170	290	330	U	330	U	270	U	310	U	370	U	**690**		350	U
Benzo(k)fluoranthene	NA	NA	330	U	330	U	270	U	310	U	370	U	**1200**		350	U
bis(2-Chloroethoxy)methane	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
bis-(2-Chloroethyl) ether	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
Bis(2-ethylhexyl)phthalate	NA	NA	330	U	330	U	270	U	310	U	230	J	260	J	350	U
Butyl benzyl phthalate	NA	11000	330	U	330	U	270	U	310	U	370	U	310	U	350	U
Caprolactam	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
Carbazole	NA	NA	330	U	330	U	270	U	310	U	370	U	**380**		350	U
Chrysene	340	500	330	U	330	U	84	J	57	J	96	J	**1800**		350	U
Dibenzo(a,h)anthracene	60	NA	330	U	330	U	270	U	310	U	370	U	**260**	J	350	U
Dibenzofuran	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
Diethylphthalate	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
Dimethyl phthalate	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
Di-n-butyl phthalate	NA	11000	330	U	330	U	270	U	310	U	370	U	310	U	350	U
Di-n-octyl phthalate	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
Fluoranthene	750	2900	210	J	96	J	210	J	140	J	190	J	**3800**		72	J
Fluorene	190	34.64	330	U	330	U	270	U	310	U	370	U	**200**	J	350	U
Hexachlorobenzene	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
Hexachlorobutadiene	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
Hexachlorocyclopentadiene	NA	NA	330	U	330	U	270	U	310	U	370	UJ	310	UJ	350	UJ
Hexachloroethane	NA	1000	330	U	330	U	270	U	310	U	370	U	310	U	350	U
Indeno(1,2,3-cd)pyrene	200	78	330	U	330	U	270	U	310	U	370	U	**1000**		350	U
Isophorone	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
Naphthalene	NA	480	330	U	330	U	270	U	310	U	370	U	310	U	350	U
Nitrobenzene	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
n-Nitroso-di-n-propylamine	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
n-Nitrosodiphenylamine	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
Pentachlorophenol	NA	NA	650	R	650	R	520	R	610	R	720	U	610	U	690	U
Phenanthrene	560	850	330	U	330	U	70	J	310	U	110	J	**2300**		350	U

Phenol	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U	350	U
Pyrene	490	660	330	U	330	U	270	U	310	U	370	U	**3300**		350	U

TABLE 4 (continued)
Sylvan Slough
Sediment Analytical Results
Semi-volatile Organic Compounds (ug/Kg)

Volatile Compound	Ontario Sediment Benchark for Lowest Effect Level [1,3]	United States EPA Ecotox Thresholds or ARCS Effect Concentrations [2,3]	X207 Sediment ug/Kg Result	X207 Flag	X208 Sediment ug/Kg Result	X208 Flag	X209 Sediment ug/Kg Result	X209 Flag	X210 Sediment ug/Kg Result	X210 Flag	X211 Sediment ug/Kg Result	X211 Flag	X212 Sediment ug/Kg Result	X212 Flag
1,1'-Biphenyl	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
1,2,4,5-Tetrachlorobenzene	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
2,2-oxybis (1-chloropropane)	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
2,3,4,6-Tetrachlorophenol	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
2,4,5-Trichlorophenol	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
2,4,6-Trichlorophenol	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
2,4-Dichlorophenol	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
2,4-Dimethylphenol	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
2,4-Dinitrophenol	NA	NA	670	U	750	U	750	U	790	U	700	U	720	U
2,4-Dinitrotoluene	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
2,6-Dinitrotoluene	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
2-Chloronaphthalene	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
2-Chlorophenol	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
2-Methylnaphthalene	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
2-Methylphenol (o-cresol)	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
2-Nitroaniline	NA	NA	670	U	750	U	750	U	790	U	700	U	720	U
2-Nitrophenol	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
3,3-Dichlorobenzene	NA	NA	350	UJ	390	UJ	390	UJ	400	UJ	360	U	370	U
3-Nitroaniline	NA	NA	670	U	750	U	750	U	790	U	700	U	720	U
4,6 Dinitro 2-methylphenol	NA	NA	670	U	750	U	750	U	790	U	700	U	720	U
4-Bromophenyl phenyl ether	NA	1300	350	U	390	U	390	U	400	U	360	U	370	U
4-Chloro-3-methylphenol	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
4-Chloroaniline	NA	NA	350	UJ	390	UJ	390	UJ	400	UJ	360	U	370	U
4-Chlorophenyl phenyl ether	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
4-Methylphenol (m/p-cresol)	NA	NA	350	U	390	UJ	390	U	400	U	360	U	370	U
4-Nitroaniline	NA	NA	670	U	750	U	750	U	790	U	700	U	720	U
4-Nitrophenol	NA	NA	670	U	750	U	750	U	790	U	700	U	720	U
Acenaphthene	NA	620	350	U	390	U	390	U	400	U	360	U	370	U
Acenaphthylene	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
Acetophenone	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
Anthracene	220	31.62	350	U	390	U	390	U	400	U	360	U	370	U
Atrazine	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
Benzaldehyde	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
Benzo(a)anthracene	320	NA	55	J	390	U	390	U	400	U	360	U	370	U
Benzo(a)pyrene	370	0.43	350	U	390	U	390	U	400	U	360	U	370	U
Benzo(b)fluoranthene	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
Benzo(g,h,i)perylene	170	290	350	U	390	U	390	U	400	U	360	U	370	U
Benzo(k)fluoranthene	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
bis(2-Chloroethoxy)methane	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
bis-(2-Chloroethyl) ether	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
Bis(2-ethylhexyl)phthalate	NA	NA	340	J	190	J	170	J	220	J	360	U	370	U
Butyl benzyl phthalate	NA	11000	350	U	390	U	390	U	400	U	360	U	370	U
Caprolactam	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
Carbazole	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
Chrysene	340	500	69	J	390	U	390	U	400	U	360	U	370	U
Dibenzo(a,h)anthracene	60	NA	350	U	390	U	390	U	400	U	360	U	370	U
Dibenzofuran	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
Diethylphthalate	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
Dimethyl phthalate	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
Di-n-butyl phthalate	NA	11000	350	U	390	U	390	U	400	U	360	U	370	U
Di-n-octyl phthalate	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
Fluoranthene	750	2900	120	J	390	U	74	J	130	J	66	J	370	U
Fluorene	190	34.64	350	U	390	U	390	U	400	U	360	U	370	U
Hexachlorobenzene	NA	NA	350	U	390	UJ	390	U	400	U	360	U	370	U
Hexachlorobutadiene	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
Hexachlorocyclopentadiene	NA	NA	350	UJ	390	UJ	390	UJ	400	UJ	360	U	370	U
Hexachloroethane	NA	1000	350	U	390	U	390	U	400	U	360	U	370	U
Indeno(1,2,3-cd)pyrene	200	78	350	U	390	U	390	U	400	U	360	U	370	U
Isophorone	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
Naphthalene	NA	480	350	U	390	U	390	U	400	U	360	U	370	U
Nitrobenzene	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
n-Nitroso-di-n-propylamine	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
n-Nitrosodiphenylamine	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
Pentachlorophenol	NA	NA	670	U	750	UJ	750	U	790	U	700	R	720	R
Phenanthrene	560	850	350	U	390	U	390	U	400	U	360	U	370	U

Phenol	NA	NA	350	U	390	U	390	U	400	U	360	U	370	U
Pyrene	490	660	350	U	390	U	390	U	400	U	360	U	370	U

TABLE 4 (continued)
Sylvan Slough
Sediment Analytical Results
Semi-volatile Organic Compounds (ug/Kg)

Volatile Compound	Ontario Sediment Benchark for Lowest Effect Level [1,3]	United States EPA Ecotox Thresholds or ARCS Effect Concentrations [2,3]	X213 Sediment ug/Kg Result	X213 Flag	X214 Sediment ug/Kg Result	X214 Flag	X215 Sediment ug/Kg Result	X215 Flag	X216 Sediment ug/Kg Result	X216 Flag
1,1'-Biphenyl	NA	NA	340	U	380	U	380	U	390	U
1,2,4,5-Tetrachlorobenzene	NA	NA	340	U	380	U	380	U	390	U
2,2-oxybis (1-chloropropane)	NA	NA	340	U	380	U	380	U	390	U
2,3,4,6-Tetrachlorophenol	NA	NA	340	U	380	U	380	U	390	U
2,4,5-Trichlorophenol	NA	NA	340	U	380	U	380	U	390	U
2,4,6-Trichlorophenol	NA	NA	340	U	380	U	380	U	390	U
2,4-Dichlorophenol	NA	NA	340	U	380	U	380	U	390	U
2,4-Dimethylphenol	NA	NA	340	U	380	U	380	U	390	U
2,4-Dinitrophenol	NA	NA	660	U	730	U	730	U	750	U
2,4-Dinitrotoluene	NA	NA	340	U	380	U	380	U	390	U
2,6-Dinitrotoluene	NA	NA	340	U	380	U	380	U	390	U
2-Chloronaphthalene	NA	NA	340	U	380	U	380	U	390	U
2-Chlorophenol	NA	NA	340	U	380	U	380	U	390	U
2-Methylnaphthalene	NA	NA	340	U	380	U	380	U	390	U
2-Methylphenol (o-cresol)	NA	NA	340	U	380	U	380	U	390	U
2-Nitroaniline	NA	NA	660	U	730	U	730	U	750	U
2-Nitrophenol	NA	NA	340	U	380	U	380	U	390	U
3,3-Dichlorobenzene	NA	NA	340	UJ	380	U	380	UJ	390	U
3-Nitroaniline	NA	NA	660	U	730	U	730	U	750	U
4,6 Dinitro 2-methylphenol	NA	NA	660	U	730	U	730	U	750	U
4-Bromophenyl phenyl ether	NA	1300	340	U	380	U	380	U	390	U
4-Chloro-3-methylphenol	NA	NA	340	U	380	U	380	U	390	U
4-Chloroaniline	NA	NA	340	UJ	380	U	380	UJ	390	U
4-Chlorophenyl phenyl ether	NA	NA	340	U	380	U	380	U	390	U
4-Methylphenol (m/p-cresol)	NA	NA	340	U	380	U	380	U	330	J
4-Nitroaniline	NA	NA	660	U	730	U	730	U	750	U
4-Nitrophenol	NA	NA	660	U	730	U	730	U	750	U
Acenaphthene	NA	620	340	U	380	U	380	U	390	U
Acenaphthylene	NA	NA	340	U	380	U	380	U	390	U
Acetophenone	NA	NA	340	U	380	U	380	U	390	U
Anthracene	220	31.62	340	U	380	U	380	U	390	U
Atrazine	NA	NA	340	U	380	U	380	U	390	U
Benzaldehyde	NA	NA	340	U	380	U	380	U	390	U
Benzo(a)anthracene	320	NA	340	U	380	U	380	U	390	U
Benzo(a)pyrene	370	0.43	340	U	380	U	380	U	390	U
Benzo(b)fluoranthene	NA	NA	340	U	380	U	380	U	390	U
Benzo(g,h,i)perylene	170	290	340	U	380	U	380	U	390	U
Benzo(k)fluoranthene	NA	NA	340	U	380	U	380	U	390	U
bis(2-Chloroethoxy)methane	NA	NA	340	U	380	U	380	U	390	U
bis-(2-Chloroethyl) ether	NA	NA	340	U	380	U	380	U	390	U
Bis(2-ethylhexyl)phthalate	NA	NA	340	U	170	J	380	U	390	U
Butyl benzyl phthalate	NA	11000	340	U	380	U	380	U	390	U
Caprolactam	NA	NA	340	U	380	U	380	U	390	U
Carbazole	NA	NA	340	U	380	U	380	U	390	U
Chrysene	340	500	340	U	380	U	380	U	390	U
Dibenzo(a,h)anthracene	60	NA	340	U	380	U	380	U	390	U
Dibenzofuran	NA	NA	340	U	380	U	380	U	390	U
Diethylphthalate	NA	NA	340	U	380	U	380	U	390	U
Dimethyl phthalate	NA	NA	340	U	380	U	380	U	390	U
Di-n-butyl phthalate	NA	11000	340	U	380	U	380	U	390	U
Di-n-octyl phthalate	NA	NA	340	U	380	U	380	U	390	U
Fluoranthene	750	2900	340	U	380	U	380	U	390	U
Fluorene	190	34.64	340	U	380	U	380	U	390	U
Hexachlorobenzene	NA	NA	340	U	380	U	380	U	390	U
Hexachlorobutadiene	NA	NA	340	U	380	U	380	U	390	U
Hexachlorocyclopentadiene	NA	NA	340	UJ	380	U	380	UJ	390	U
Hexachloroethane	NA	1000	340	U	380	U	380	U	390	U
Indeno(1,2,3-cd)pyrene	200	78	340	U	380	U	380	U	390	U
Isophorone	NA	NA	340	U	380	U	380	U	390	U
Naphthalene	NA	480	340	U	380	U	380	U	390	U
Nitrobenzene	NA	NA	340	U	380	U	380	U	390	U
n-Nitroso-di-n-propylamine	NA	NA	340	U	380	U	380	U	390	U
n-Nitrosodiphenylamine	NA	NA	340	U	380	U	380	U	390	U
Pentachlorophenol	NA	NA	660	R	730	R	730	R	750	R
Phenanthrene	560	850	340	U	380	U	380	U	390	U

Phenol	NA	NA	340	U	380	U	380	U	390	U
Pyrene	490	660	340	U	380	U	380	U	390	U

TABLE 4 (continued)
Sylvan Slough
Sediment Analytical Results
Semi-volatile Organic Compounds (ug/Kg)

NOTES:
1 Ontario Ministry of Environment Sediment Screening Level for Lowest Effect Level
2 U.S. EPA Office of Solid Waste and Emergency Response Sediment Ecotox Thresholds (ET). In cases where no ET is available, USEPA Effect Concentrations developed under ARCS program is provided. ARCS
3 NA - Indicates no benchmark identified for compound
4 Background concentration is the greatest concentration identified in either X201 or X202
5 **3300** - Indicates concentration above Sediment Screening Benchmark
5 $\boxed{9800}$ Indicates concentration is three times concentration in background sample
6 U Indicates analyte not detected at or above stated limit
7 J Result is an estimated value
UJ Result was analyzed for, but not detected at concentrations above the
8 approximate sample quantitation limit
9 R Data is unusable

TABLE 5
Sylvan Slough
Sediment Analytical Results
Pesticide/PCB Compounds (ug/Kg)

Organic Compound	Ontario Sediment Benchark for Lowest Effect Level [1,3]	United States EPA Ecotox Thresholds or ARCS Effect Concentrations [2,3]	Background [4] Sediment ug/Kg Result	Flag	X201 Sediment ug/Kg Result	Flag	X202 Sediment ug/Kg Result	Flag	X203 Sediment ug/Kg Result	Flag	X204 Sediment ug/Kg Result	Flag	X205 Sediment ug/Kg Result	Flag
Aroclor-1016	7	NA	65	U	65	U	52	U	61	U	72	U	61	U
Aroclor-1221	NA	NA	65	U	65	U	52	U	61	U	72	U	61	U
Aroclor-1232	NA	NA	65	U	65	U	52	U	61	U	72	U	61	U
Aroclor-1242	NA	NA	65	U	65	U	52	U	61	U	72	U	61	U
Aroclor-1248	30	NA	65	U	65	U	52	U	61	U	72	U	61	U
Aroclor-1254	60	NA	65	U	65	U	52	U	61	U	72	U	61	U
Aroclor-1260	5	NA	65	U	65	U	52	U	61	U	72	U	61	U
Aroclor-1262	NA	NA	65	U	65	U	52	U	61	U	370	J	61	U
Aroclor-1268	NA	NA	65	U	65	U	52	U	61	U	72	U	61	U
4,4'-DDD	NA	NA	6.5	U	6.5	U	5.2	U	6.1	U	7.2	U	6.1	U
4,4'-DDE	NA	NA	6.5	U	6.5	U	5.2	U	6.1	U	7.2	U	17	
4,4'-DDT	NA	NA	6.5	U	6.5	U	5.2	U	6.1	U	7.2	U	9.3	J
Aldrin	2	NA	3.3	U	3.3	U	2.7	U	0.96	J	1.4	J	3.1	U
alpha-BHC	6	NA	3.3	U	3.3	U	2.7	U	3.1	U	3.7	U	1.3	J
alpha-Chlordane	NA	NA	3.3	U	3.3	U	2.7	U	3.1	U	3.7	U	7.7	
beta-BHC	NA	NA	3.3	U	3.3	U	2.7	U	1.4	J	1.5	J	7.6	J
delta-BHC	NA	NA	3.3	U	3.3	U	2.7	U	3.1	U	3.7	U	3.1	U
Dieldrin	2	520	6.5	U	6.5	U	5.2	U	6.1	U	7.2	U	**7.7**	J
Endosulfan I	NA	NA	3.3	U	3.3	U	2.7	U	3.1	U	3.7	U	3.1	U
Endosulfan II	NA	NA	6.5	U	6.5	U	5.2	U	6.1	U	7.2	U	6.1	U
Endosulfan sulfate	NA	NA	6.5	U	6.5	U	5.2	U	6.1	U	7.2	U	6.1	U
Endrin	3	20	6.5	R	6.5	R	5.2	R	6.1	R	7.2	R	2.7	J
Endrin aldehyde	NA	NA	6.5	U	6.5	U	5.2	U	6.1	U	7.2	U	6.1	U
Endrin ketone	NA	NA	6.5	U	6.5	U	5.2	U	6.1	U	7.2	U	7.9	J
gamma-BHC (Lindane)	3	0.37	3.3	U	3.3	U	2.7	U	3.1	U	3.7	U	3.1	U
gamma-Chlordane	NA	NA	0.95	J	0.95	J	0.74	J	0.87	J	3.7	U	12	J
Heptachlor	NA	NA	3.3	U	3.3	U	2.7	U	3.1	U	3.7	U	3.4	J
Heptachlor epoxide	5	NA	3.3	U	3.3	U	2.7	U	3.1	U	3.7	U	5.3	J
Methoxychlor	NA	NA	33	U	33	U	27	U	31	U	37	U	29	J
Toxaphene	NA	NA	330	U	330	U	270	U	310	U	370	U	310	U

NOTES:
1 Ontario Ministry of Environment Sediment Screening Level for Lowest Effect Level
2 U.S. EPA Office of Solid Waste and Emergency Response Sediment Ecotox Thresholds (ET). In cases where no ET is available, USEPA Effect Concentrations developed under ARCS program is provided. ARCS benchmarks identified with either TEC = Threshold Effect Concentration or PEC = Probable Effect
3 NA - Indicates no benchmark identified for compound
4 Background is considered the greatest concentration observed in either X201 or X202
5 **7.7** - Indicates concentration above Sediment Screening Benchmark
6 370 Indicates concentration is three times concentration in background sample
7 U Indicates analyte not detected at or above stated limit
8 J Result is an estimated value
9 R Data is unusable

TABLE 5 (continued)
Sylvan Slough
Sediment Analytical Results
Pesticide/PCB Compounds (ug/Kg)

Organic Compound	Ontario Sediment Benchark for Lowest Effect Level [1,3]	United States EPA Ecotox Thresholds or ARCS Effect Concentrations [2,3]	X206 Sediment ug/Kg Result	Flag	X207 Sediment ug/Kg Result	Flag	X208 Sediment ug/Kg Result	Flag	X209 Sediment ug/Kg Result	Flag	X210 Sediment ug/Kg Result	Flag	X211 Sediment ug/Kg Result	Flag
Aroclor-1016	7	NA	69	U	67	U	75	U	75	U	79	U	70	U
Aroclor-1221	NA	NA	69	U	67	U	75	U	75	U	79	U	70	U
Aroclor-1232	NA	NA	69	U	67	U	75	U	75	U	79	U	70	U
Aroclor-1242	NA	NA	69	U	67	U	75	U	75	U	79	U	70	U
Aroclor-1248	30	NA	69	U	67	U	75	U	75	U	79	U	70	U
Aroclor-1254	60	NA	69	U	67	U	75	U	75	U	79	U	70	U
Aroclor-1260	5	NA	69	U	67	U	75	U	75	U	79	U	70	U
Aroclor-1262	NA	NA	69	U	67	U	75	U	75	U	79	U	70	U
Aroclor-1268	NA	NA	69	U	67	U	75	U	75	U	79	U	70	U
4,4'-DDD	NA	NA	6.9	U	6.7	U	7.5	U	7.5	U	7.9	U	7	U
4,4'-DDE	NA	NA	6.9	U	6.7	U	7.5	U	7.5	U	7.9	U	7	U
4,4'-DDT	NA	NA	6.9	U	6.7	U	7.5	U	7.5	U	7.9	U	7	U
Aldrin	2	NA	3.5	U	3.5	U	3.9	U	3.9	U	4	U	3.6	U
alpha-BHC	6	NA	3.5	U	3.5	U	3.9	U	3.9	U	4	U	3.6	U
alpha-Chlordane	NA	NA	3.5	U	3.5	U	3.9	U	3.9	U	4	U	3.6	U
beta-BHC	NA	NA	3.5	U	3.5	U	3.9	U	3.9	U	4	U	1.5	J
delta-BHC	NA	NA	3.5	U	3.5	U	3.9	U	3.9	U	4	U	3.6	U
Dieldrin	2	520	6.9	U	6.7	U	7.5	U	7.5	U	7.9	U	7	U
Endosulfan I	NA	NA	3.5	U	3.5	U	3.9	U	3.9	U	4	U	3.6	U
Endosulfan II	NA	NA	6.9	U	6.7	U	7.5	U	7.5	U	7.9	U	7	U
Endosulfan sulfate	NA	NA	6.9	U	6.7	U	7.5	U	7.5	U	7.9	U	7	U
Endrin	3	20	6.9	R	6.7	R	7.5	R	7.5	R	7.9	R	7	R
Endrin aldehyde	NA	NA	6.9	U	6.7	U	7.5	U	7.5	U	7.9	U	7	U
Endrin ketone	NA	NA	6.9	U	6.7	U	7.5	U	7.5	U	7.9	U	7	U
gamma-BHC (Lindane)	3	0.37	3.5	U	3.5	U	3.9	U	3.9	U	4	U	3.6	U
gamma-Chlordane	NA	NA	3.5	U	3.5	U	3.9	U	3.9	U	1.1	J	3.6	U
Heptachlor	NA	NA	3.5	U	3.5	U	3.9	U	3.9	U	4	U	3.6	U
Heptachlor epoxide	5	NA	3.5	U	3.5	U	3.9	U	3.9	U	4	U	3.6	U
Methoxychlor	NA	NA	35	U	35	U	39	U	39	U	40	U	36	U
Toxaphene	NA	NA	350	U	350	U	390	U	390	U	400	U	360	U

NOTES:
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4 Background is considered the greatest concentration observed in either X201 or X202
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6 370 Indicates concentration is three times concentration in background sample
7 U Indicates analyte not detected at or above stated limit
8 J Result is an estimated value
9 R Data is unusable

TABLE 5 (continued)
Sylvan Slough
Sediment Analytical Results
Pesticide/PCB Compounds (ug/Kg)

Organic Compound	Ontario Sediment Benchark for Lowest Effect Level [1,3]	United States EPA Ecotox Thresholds or ARCS Effect Concentrations [2,3]	X212 Sediment ug/Kg Result	Flag	X213 Sediment ug/Kg Result	Flag	X214 Sediment ug/Kg Result	Flag	X215 Sediment ug/Kg Result	Flag	X216 Sediment ug/Kg Result	Flag	X220 Sediment ug/Kg Result	Flag
Aroclor-1016	7	NA	72	U	66	U	73	U	73	U	75	U	77	U
Aroclor-1221	NA	NA	72	U	66	U	73	U	73	U	75	U	77	U
Aroclor-1232	NA	NA	72	U	66	U	73	U	73	U	75	U	77	U
Aroclor-1242	NA	NA	72	U	66	U	73	U	73	U	75	U	77	U
Aroclor-1248	30	NA	72	U	66	U	73	U	73	U	75	U	77	U
Aroclor-1254	60	NA	72	U	66	U	73	U	73	U	75	U	77	U
Aroclor-1260	5	NA	72	U	66	U	73	U	73	U	75	U	77	U
Aroclor-1262	NA	NA	72	U	66	U	73	U	73	U	75	U	77	U
Aroclor-1268	NA	NA	72	U	66	U	73	U	73	U	75	U	77	U
4,4'-DDD	NA	NA	7.2	U	6.6	U	7.3	U	7.3	U	7.5	U	7.7	U
4,4'-DDE	NA	NA	7.2	U	6.6	U	7.3	U	7.3	U	7.2	J	7.7	U
4,4'-DDT	NA	NA	7.2	U	6.6	U	7.3	U	7.3	U	2.8	J	7.7	U
Aldrin	2	NA	3.7	U	3.4	U	3.8	U	3.8	U	1.4	J	4	U
alpha-BHC	6	NA	3.7	U	3.4	U	3.8	U	3.8	U	3.9	U	4	U
alpha-Chlordane	NA	NA	3.7	U	3.4	U	3.8	U	3.8	U	3.7	J	4	U
beta-BHC	NA	NA	3.7	U	3.4	U	3.8	U	3.8	U	14	J	4	U
delta-BHC	NA	NA	3.7	U	3.4	U	3.8	U	3.8	U	3.9	U	4	U
Dieldrin	2	520	7.2	U	6.6	U	7.3	U	7.3	U	2.4	J	7.7	U
Endosulfan I	NA	NA	3.7	U	3.4	U	3.8	U	3.8	U	1.4	J	4	U
Endosulfan II	NA	NA	7.2	U	6.6	U	7.3	U	7.3	U	7.5	U	7.7	U
Endosulfan sulfate	NA	NA	7.2	U	6.6	U	7.3	U	7.3	U	7.5	U	7.7	U
Endrin	3	20	7.2	R	6.6	R	7.3	R	7.3	R	4.8	J	7.7	R
Endrin aldehyde	NA	NA	7.2	U	6.6	U	7.3	U	7.3	U	7.5	U	7.7	U
Endrin ketone	NA	NA	7.2	U	6.6	U	7.3	U	7.3	U	8.4	J	7.7	U
gamma-BHC (Lindane)	3	0.37	3.7	U	3.4	U	3.8	U	3.8	U	3.9	U	4	U
gamma-Chlordane	NA	NA	3.7	U	3.4	U	3.8	U	1	J	1.4	J	4	U
Heptachlor	NA	NA	3.7	U	3.4	U	3.8	U	3.8	U	3.9	U	4	U
Heptachlor epoxide	5	NA	3.7	U	3.4	U	3.8	U	3.8	U	3.9	U	4	U
Methoxychlor	NA	NA	37	U	34	U	38	U	38	U	31	J	40	U
Toxaphene	NA	NA	370	U	340	U	380	U	380	U	390	U	400	U

NOTES:
1 Ontario Ministry of Environment Sediment Screening Level for Lowest Effect Level
2 U.S. EPA Office of Solid Waste and Emergency Response Sediment Ecotox Thresholds (ET). In cases where no ET is available, USEPA Effect Concentrations developed under ARCS program is provided. ARCS benchmarks identified with either TEC = Threshold Effect Concentration or PEC = Probable Effect
3 NA - Indicates no benchmark identified for compound
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6 370 Indicates concentration is three times concentration in background sample
7 U Indicates analyte not detected at or above stated limit
8 J Result is an estimated value
9 R Data is unusable

Appendix A

Description and History of Local Industry

Appendix A

Description and History of Local Industry

International Harvester (Navistar)

In 1868 the company changed its name to the In circa 1904 the Moline Plow Company built a factory in the Sylvan Slough Site area in Rock Island, west of 42nd Street and north of 5th Avenue (Shih). In 1918 International Harvester took possession of the property and buildings to serve its manufacturing interests (Shih). As of 1920, the International Harvester (IH) facility encompassed over 24 acres and included a large foundry, laboratory, multiple machine shops, and its own power house (Sanborn 1920), foundry, laboratory, and machine shop. The company to continued to grow and prosper until the Rock Island facility 46 inter-connected structures located on 86 acres south of the Sylvan Slough and north of 5th Avenue in Rock Falls (Shih). The property extended from approximately 28th Street on the west, to 44th Street on the east. International Harvester built a variety of farm-related equipment at the facility with two-wheel and four-wheel drive tractors being the principal product lines (Shih). The IH plant included a total of 46 inter-connected structures almost entirely constructed on a concrete slab foundation (Terracon, 2009). The facility had its own power plant and coke-fired ovens for its foundry (Sanborn 1906 – 1957). International Harvester also conducted casting, machining, and painting at the facility (Sanborn 1906 – 1957).

In February of 1985 IH sold its agricultural division (all assets except the land and buildings) to J.I. Case Company and in December of 1985, all manufacturing ceased (Richardson, 1987). In 1986 the company changed its name to Navistar International (Navistar). In 1988, following several voluntary environmental investigations conducted on the property, Navistar sold 66 of its 86 acres to the City of Rock Island (Shih 2011). The City then conveyed the property to local developers and the property became known as the “Quad City Industrial Center” (Shih 2011). (Quad City Industrial Center [QCIC] is discussed in detail below.)

The 20 acres retained by Navistar is a strip of land, which parallels the Sylvan Slough (Shih). The eastern portion of the 20-acre parcel is directly north of the QCIC and contains several buildings (Shih**).** The western portion of Navistar’s 20 acres is known by many as the oil remediation site (discussed in more detail below)(Shih).

In February of 1993, the USCG, U.S. EPA, and several state agencies responded to an oil release into the Sylvan Slough (Bade). Additional investigation linked the majority of the spill to a sewer system located on both Navistar and Burlington Northern & Santa Fe (BNSF) property that had been impacted by oil releases on Iowa-Interstate Railroad (IIRR) property (Kammueller 1993). (The history and involvement of BNSF and IIRR is discussed in more detail below). Navistar was a signatory to an Administrative Order on Consent with U.S. EPA in 1994 requiring the investigation and remediation of the hydrocarbons entering the slough (USEPA, 1994). Consultants for Navistar identified five separate areas totaling over three (3) acres where free-phase hydrocarbon was likely floating on the groundwater at the Iowa Interstate property (USEPA, 1998). By July of 1997 a product recovery system was operational and as of January of 2011, the system had recovered over 1900 gallons of free product from the subsurface (Posteuca). The volume of hydrocarbon recovery per month has diminished significantly and Navistar believes that the remediation is nearing completion (Shih). The western portion of the property that underwent remediation is approximately 10 acres in size and currently contains numerous monitoring and extraction wells along with small building that houses treatment equipment.

In August of 1995, the United States Coast Guard (USCG) responded to a spill along the Sylvan Slough (Geraghty & Miller, 1995). The oil release was traced to the former IH Outfall Station #3 which is located on property that was still owned by Navistar (Geraghty & Miller, 1995). The outfall was connected to Building 77, which housed IH's former wastewater treatment facilities (Geraghty & Miller, 1995). Under a voluntary action with USEPA, Navistar spent over $250,000 to clean and remove oily sludges inside the building and pipes, and to re-route the discharge point to the City's sanitary system (Shih). Several USTs present at the 20-acre parcel were pumped, cleaned, and abandoned in-place (ARCADIS). In 2001, Navistar received closure of this issue from USEPA. Navistar then returned the property back to the City of Rock Island (Shih). There are currently no buildings on the 20-acre parcel and it is covered mostly by a concrete.

Quad Cities Industrial Center

In March of 1988, International (Navistar) sold 66 of its 86-acre facility to the City of Rock Island for $1.00 (Shih). The City then conveyed the property to L.R.C. Developers, Inc. and it became known as the Quad Cities Industrial Center (QCIC) (Shih). The sale obligated the purchaser and all subsequent owners to assume environmental liabilities at the site (Shih). Environmental issues at the QCIC have been handled outside of the CERCLA removal/remedial programs, primarily under Illinois EPA's voluntary Site Remediation Program (Illinois, BOL File QCIC).

Prior to the property's transfer to the City of Rock Island, Navistar spent about $890,000 to address environmental issues (asbestos removal, PCB removal, waste disposal, environmental assessments, soil and groundwater sampling) (Shih). At the time when the property was sold to the city, there were a total of 46 interconnected structures totaling approximately two million square feet (Terracon, 2009).

QCIC became involved in the response to the oil releases to the slough in February 1993 because of its history as a portion of the International Harvester facility. L.R.C. Developers, the owners of the property were involved in initial activities in response to the oil releases in February 1993, but did not sign onto either of the Consent Orders with U.S. EPA to remediate the sources.

The owners of QCIC continued to develop and reconfigure the facility to meet its needs. The company has demolished and removed all but five structures, which now totals approximately one million square feet (Terracon, 2009). The western half of the QCIC contains several of the remaining above-ground structures and houses McLauglin Body Company and Blackhawk Sales Specialties.

In 2008 and 2009, Terracon Consultants Inc. conducted a multi-phased investigation on the eastern half (approximately 33.5 acres) of the QCIC property. The investigation was conducted on behalf of the City of Rock Island and L.R.C. Developers. The investigation included soil borings and sampling, monitoring well installation and groundwater sampling, and a study of geologic parameters and conditions at the site. Terracon also evaluated remaining subsurface structures at the site including: known or suspected USTs; underground pipe runs; service tunnels; and utilities. (Terracon, 2010)

Terracon's multi-phased investigation identified several semi-volatile organic compounds (SVOCs) and metals that exceeded soil concentrations established in Illinois EPA's Tiered Approach to Corrective Action Objectives (TACO). In addition, one area was identified with free product present at approximately ten feet below ground surface. Generally, areas at the QCIC with concentrations in excess of TACO values include: two UST areas near the eastern boundary; the quench oil cellar in the center; and four borings near the western boundary. Terracon's recommendation for the addressing areas of concern at the QCIC prescribed targeted excavation and engineered barriers. (Terracon, 2010)

Upon completion of the Terracon's Combined Remediation Objectives Report and Remedial Action Plan, the recommendations were provided to the L.R.C. Developers, Inc., the owner of the QCIC property. Currently, construction has begun for a building complex to store buses and maintenance equipment for the City of Rock Island's public transportation department. The building is being constructed on the eastern portion of the QCIC property where no excavation was required in accordance with the Remedial Action Plan.   L.R.C. Developers, Inc. has not performed the excavation of contaminated material located at the property's center and western portion, as recommended by Terracon.

Iowa-Interstate Railroad

The Chicago, Rock Island, and Pacific Railroad was well established on six acres on the south side of the slough in 1886 (Sanborn 1886).   The property included numerous tracks, a switching yard, and a round house (Sanborn 1886). Several individual buildings on the central and south-central portion of the property provided storage for oil and coal as well a restaurant, saloon, and depot (Sanborn 1886). The 1898 Sanborn Fire Insurance map for the area shows that the rail facility increased to over 13 acres and included a second round house (Sanborn 1898) . The facility remained relatively similar through 1950 although the first of the two roundhouses built at the facility was removed (Sanborn 1906-1950).

In approximately 1964, while owned by the Chicago, Rock Island and Pacific Rail Road, a large diesel fuel spill (volume unknown but estimated by some to approach 200,000 gallons) occurred from a 150,000 gallon above-ground tank (AST) in the rail yard (Geraghty & Miller, 1994). Although studies confirmed that diesel fuel had seeped into the ground and was floating on top of shallow groundwater near the tank, no action was taken to mitigate the problem (Geraghty & Miller, 1994). The contamination remained in the subsurface and may have been the source behind a release into the Sylvan Slough in 1979 (Kammueller, 1990).

In 1980 the Chicago, Rock Island & Pacific Railroad was ordered by the courts to shut down and liquidate its assets (Burns). In 1984, Iowa-Interstate Railroad began its operation by taking over the tracks and associated property once owned by the Chicago, Rock Island and Pacific Rail Road (Burns).

In 1993, contamination had entered a sewer system located on property to the north (owned by BNSF), began to migrate into the slough and became significant enough to cause an oil sheen more than two miles downstream (Bade). The United States Coast Guard, U.S. EPA, and several state agencies responded to the release (Bade). The U.S. EPA began negotiations for remediation with several industries/property owners in the area surrounding the release; however IIRR refused to participate in a 1994 Administrative Order on Consent. IIRR signed on an AOC with Heartland Corporation and U.S. EPA in 1998. Information regarding actions taken under the 1998 AOC could not be identified by U.S. EPA. However, individuals involved with remediation at the neighboring property believe some source removal was completed under the oversight of the U.S. EPA.

Burlington Northern & Santa Fe Railroad

The Chicago, Burlington, and Quincy Railroad owned several tracks travelling through the rail yard immediately south of the slough. (Sanborn, 1950). The tracks traveled through Rock Island and connected the area with towns to the southwest in Iowa and the east-northeast in Illinois. In 1970, the Chicago, Burlington, and Quincy Railroad merged with several other railroad companies to become the Burlington Northern & Santa Fe Railroad (BNSF) (Burns). Through the 1970 merger, BNSF become owner to several tracks in the Sylvan Slough project area as well as approximately 5 feet of shoreline along the south side of the slough.

In approximately 1964 a large diesel fuel spill (volume unknown but estimated by some to approach 200,000 gallons) occurred from a 150,000 gallon above-ground tank (AST) in the rail yard south of BNSF. The spill was not adequately addressed and the petroleum product moved northward toward the slough. The contamination ultimately migrated into a system of sewers owned by BNSF and began to discharge into the slough (Geraghty & Miller, 1994). BNSF became a signatory to an Administrative Order on Consent with U.S. EPA in 1994 requiring the investigation and remediation of the hydrocarbons entering the slough (USEPA, 1994).

Consultants for BNSF and Navistar identified five separate areas totaling over three (3) acres where free-phase hydrocarbon was likely floating on the groundwater at the Iowa Interstate property (USEPA, 1998). By July of 1997 a product recovery system was operational and as of January of 2011, the system had recovered over 1900 gallons of free product from the subsurface (Posteuca).

Quad Cities Civic Center

In 1988, the easternmost portion of Deer Plow and Planter Works (south of the slough and between 12th and 14th Streets) was donated to the city of Moline as a location for the construction of the Quad Cities Civic Center. (John Deere Seeding and Cylinder is discussed in more detail below.) In 1989 work began on-site to demolish existing structures and address environmental concerns resulting from industrial activities at the facility. Remediation efforts focused on Underground Storage Tank (UST) excavation and removal, disposal of petroleum products, and asbestos abatement. During construction of the Civic Center, old cutting oils were identified in the subsurface at three caisson locations. Product was removed via excavation and a groundwater pump and treat system to Illinois EPA's satisfaction. Groundwater monitoring continued through construction and into 2003. The site moved into final demonstration of closure phase with continued groundwater monitoring. (Terracon, 2003)

Rock Island Arsenal

Arsenal Island consists of approximately 946 acres and contains Rock Island Arsenal and Rock Island National Cemetery. The island has a long history of use as a military base and manufacturing center and is presently the largest government owned and operating arsenal in the country. A 20-acre inactive landfill commonly referred to as "The Old Landfill" is present on the south-central part of Rock Island and borders the Slough. The Old Landfill is an inactive industrial landfill that operated between 1920 and 1965. It was located at the south- central part of Rock Island Arsenal bordering Sylvan Slough and consisted of approximately 20 acres.

Waste oils, paints, solvents, and degreaser sludges, cyanide or heat treating salts, wastewater treatment sludges and other industrial wastes were believed to have been disposed of onsite. The wastes were reportedly placed in pits or trenches within the landfill and burned or allowed to percolate into the ground. Also near the landfill was a shell breaker and explosives pit used for the disposal and burning of Civil and Spanish American War ammunition. (Illinois EPA)

The landfill and the arsenal are currently being addressed under CERCLA Section 120 and the Defense Environmental Restoration Program with oversight by Illinois EPA. (Lake, 2011) A multi-phase Remedial Investigation/Feasibility Study (RI/FS) was conducted at the landfill in the 1990s (SAIC). Sampling and analysis was conducted on landfill soils, groundwater, soil gas in and around the landfill (SAIC). In addition, surface water and sediments in the slough were also collected and analyzed (SAIC). In consideration of sampling and analysis results of all of the separate environmental media, compounds detected most often were chlorinated solvents and semi-volatile organic compounds (SVOCs) (SAIC). Various remedial alternatives are currently under consideration to address environmental conditions of concern at the landfill and arsenal. Illinois EPA is the lead agency and administrative controls are in place that will ensure that all issues at the facility will be addressed in accordance with CERCLA.

John Deere Seeding and Cylinder

John Deere Seeding and Cylinder, formerly John Deere Plow is located at 501 River Drive (formerly Third Avenue) in Moline (B&V). John Deere has manufactured farm equipment, hydraulic cylinders, and hardware at this location since 1837 (B&V; Jones). Based on Sanborn Fire Insurance Maps, the company began operations on approximately ten acres between 12th and 14th Streets on the south shore of the Moline Pool of the Mississippi River (Sanborn, 1886). The facility appears to have grown westward through the acquisition of neighboring facilities and open ground. As of 1957, the company became “John Deere Harvester Works and extended westward to 2nd Street and several feet south of the shore of the Sylvan Slough (Sanborn, 1957). The facility encompassed approximately 65 acres as of 1957 (Sanborn, 1957).

Major manufacturing processes conducted at the facility included heat treating, casting, forging, grinding, painting and paint stripping, and chromium and nickel plating of various tractor parts (Sanborn, 1957; Jones). The facility was actively managed under the Resource Conservation and Recovery Act (RCRA) program and Bureau of Land Files indicate issues relating to non-compliance were not significant (primarily administrative). As of 2005, John Deere was progressing through closure of RCRA regulated units and in 2008, it began voluntary closure of several units through Illinois EPA's voluntary program (Rickert; Munie).

In 1992 the John Deere addressed several underground storage tanks located at the facility (Twin City Testing, 1992a; Twin City Testing, 1992b) According to Twin City Testing Corporation (TCT), the tanks contained diesel fuel, kerosene, and water (1992a; 1992b). TCT excavated the tanks and contaminated soil and John Deere instituted a soil and groundwater monitoring program (Terracon, 1993). A No Further Remediation (NFR) letter was issued by Illinois EPA for the LUST incident in 2010 (Lowder).

MidAmerican Energy Company

MidAmerican Energy Company is located at 100 2nd Street in Moline Illinois. The facility houses a low head hydroelectric plant occupying six acres and commonly referred to as the "Moline Generating Plant". MidAmerican Energy was formerly known as Iowa-Illinois Gas and Electric. The property currently owned and operated by MidAmerican once contained a Manufactured Gas Plant (MGP) that was owned and operated by People Light & Fuel Company, which later became known Peoples Power & Light Company. (Sanborn, 1892 and 1912; Baker, 1990)

In accordance with fire insurance maps produced by the Sanborn Company, Peoples Power and Light Company began operation at the site circa 1892 (Sanborn). At the time, the facility contained 12 dynamos (electric generators) fueled by coal combustion (Sanborn). By 1912 the facility expanded to include newer equipment to create electricity using coal-fired boilers and generators (Sanborn, 1892 and 1912). The company also added a Manufactured Gas Plant (Sanborn, 1892 and 1912).

In 1990 Iowa-Illinois Gas and Electric began a multi-phase investigation of the MGP property including soil, groundwater, and geophysical investigations (Baker, 1991). Based on the investigation results, Baker later conducted a feasibility study and risk assessment which was completed in 1995 (IT Corp). In the summer of 1995, 2,300 cubic yards of contaminated soil was excavated from the property and shipped off-site for treatment. The soil excavation was coupled with groundwater monitoring and further TACO analysis under Illinois SRP Program into 2001. In December of 2001, a site-wide NFR was registered in the Rock Island County Recorder’s Office.

Moline North Sewage Treatment Plant
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The City of Moline constructed its North Slope Water Pollution Control Center (sewage treatment plant) on the south shore of the secondary channel of the Mississippi River in 1966 (City of Moline). The 3.5 acres facility is located at 7 1st Avenue in Moline. In accordance with an 1938 aerial photograph of the area, the property appeared to be residential prior to its development by the City (USDA). In 1976 the facility was updated to provide secondary treatment for the wastewater prior to discharge into the Mississippi (City of Moline).

In approximately 1992, the city started receiving complaints about oil discharging from its 44th Street 72-inch storm sewer entering Sylvan Slough just west of the treatment plant (Kammueller, 1992). Upon further investigation, the city observed that the oil was entering the storm sewer beneath a parking lot located between 1st and 4th Avenues, and east of what was the QCIC's office building in 1992 (Kammueller, 1992) . The sewer pipe was approximately 17 feet below grade at the point where oil was penetrating the sewer line's concrete collar (Kammueller, 1992). Based on the location where the oil was entering the sewer line, it is unlikely that the sewage treatment plant or the city's associated property had caused the oil observed in the slough. (A Site Investigation conducted in 2008 at the Quad City Industrial Complex noted the presence of three 12,000-gallon underground storage tanks at the old Farmall / International Harvester Facility just east of the area of concern within the storm sewer.)

Midway Oil

The Midway Oil Company is located at 4301 1st Avenue, Rock Island, Illinois. Midway Oil was the former site of a fueling station, storage facility, and warehouse that began operations at this address circa 1945. Historically, the 0.5-acre property contained as many as eight petroleum storage tanks. Missman Stanley & Associates, an engineering and environmental services company began an investigation of the property on behalf of the city, who intended to redevelop the property under the Brownfield program. Through soil and groundwater analysis, Missman, Stanley and Associates (Missman) identified concentrations in excess of the soil and groundwater objectives for commercial properties under TACO. The contaminants of concern in the soil included benzene, benzo(a)anthracene, and lead. The contaminants of concern in the groundwater included benzene, benzo(a)anthracene, and several other semi-volatile compounds. (Missman, 2001)

In accordance with TACO regulations, five areas on the site underwent soil excavation and treatment totaling 400 cubic yards of soil. The excavations were backfilled using treated soil and compost material. In consideration of site conditions and further analysis using formulas contained in the TACO regulations, no groundwater treatment was deemed necessary. (EnviroNET, 2006a)

The Midway Oil property became part of several properties along the south side of Sylvan Slough, that the city of Rock Island planned to use to create a “passive recreational venue” known as the Sylvan Slough Natural Area (Missman, 2004). The other two properties are adjacent to the east and are known as the “Willey” and “Andich” properties (EnviroNET, 2006b). In accordance with the remedial action plan and the revised remedial action plan authorized by the city, approximately 4,365 cubic yards of soil contaminated with inorganics, volatile organics, and semi-volatile organics was excavated and placed in bio-piles for biodegradation along with nutrients and compost material (EnviroNET, 2006). After approximately six months, the soil in the bio-piles met corrective action objectives for inorganics and VOCs, but not semi-volatiles (EnviroNET, 2006). However, the bio-piles were deconstructed and spread out over an approximately 2.5-acre area for continued compost/biodegredation activitiy (EnviroNET, 2006). EnviroNET is considering conducting further statistical analysis to determine if biodegradation has reduced SVOCs to meet corrective action objectives for the compost areas at the former Andich and Willey properties (Newell).

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Appendix B

Target Compound List

TARGET COMPOUND LIST

Volatile Target Compounds

Chloromethane	1,2-Dichloropropane
Bromomethane	cis-1,3-Dichloropropene
Vinyl Chlorde	Trichloroethene
Chloroethane	Dibromochloromethane
Methylene Chloride	1,1,2-Trichloroethane
Acetone	Benzene
Carbon Disulfide	trans-1,3-Dichloropropene
1,1-Dichloroethene	Bromoform
1,1-Dichloroethane	4-Methyl-2-pentanone
1,2-Dichloroehtene (total)	2-Hexanone
Chloroform	Tetrachloroethene
1,2-Dichloroethane	1,1,2,2-Tetrachloroethane
2-Butanone	Toluene
1,1,1-Trichloroethane	Chlorobenzene
Carbon Tetrachloride	Ethylbenzene
Vinyl Acetate	Styrene
Bromodichloromethane	Xylenes (total)

Base/Neutral Target Compounds

Hexachloroethane	2,4-Dinitrotoluene
bis(2-Chloroethyl) Ether	Diethylphthalate
Benzyl Alcohol	N-Nitrosodiphenylamine
bis (2-Chloroisopropyl) Ether	Hexachlorobenzene
N-Nitroso-Di-n-Propylamine	Phenanthrene
Nitrobenzene	4-Bromophenyl-phenylether
Hexachlorobutadiene	Anthracene
2-Methylnaphthalene	Di-n-Butylphthalate

1,2,4-Trichlorobenzene	Fluoranthene
Isophorone	Pyrene
Naphthalene	Butylbenzylphthalate
4-Chloroaniline	bis(2-Ethylhexyl)Phthalate
bis(2-chloroethoxy)Methane	Chrysene
Hexachlorocyclopentadiene	Benzo(a)Anthracene
2-Chloronaphthalene	3-3'-Dichlorobenzidene
2-Nitroaniline	Di-n-Octyl Phthalate
Acenaphthylene	Benzo(b)Fluoranthene
3-Nitroaniline	Benzo(k)Fluoranthene
Acenaphthene	Benzo(a)Pyrene
Dibenzofuran	Ideno(1,2,3-cd)Pyrene
Dimethyl Phthalate	Dibenz(a,h)Anthracene
2,6-Dinitrotoluene	Benzo(g,h,i)Perylene
Fluorene	1,2-Dichlorobenzene
4-Nitroaniline	1,3-Dichlorobenzene
4-Chlorophenyl-phenylether	1,4-Dichlorobenzene

Acid Target Compounds

Benzoic Acid	2,4,6-Trichlorophenol
Phenol	2,4,5-Trichlorophenol
2-Chlorophenol	4-Chloro-3-methylphenol
2-Nitrophenol	2,4-Dinitrophenol
2-Methylphenol	2-Methyl-4,6-dinitrophenol
2,4-Dimethylphenol	Pentachlorophenol
4-Methylphenol	4-Nitrophenol
2,4-Dichlorophenol	

Pesticide/PCB Target Compounds

alpha-BHC	Endrin Ketone
beta-BHC	Endosulfan Sulfate
delta-BHC	Methoxychlor
gamma-BHC (Lindane)	alpha-Chlordane
Heptachlor	gamma-Chlordane
Aldrin	Toxaphene
Heptachlor epoxide	Aroclor-1016
Endosulfan I	Aroclor-1221
4,4'-DDE	Aroclor-1232
Dieldrin	Aroclor-1242
Endrin	Aroclor-1248
4,4'-DDD	Aroclor-1254
Endosulfan II	Aroclor-1260
4,4'-DDT	

Inorganic Target Compounds

Aluminum	Manganese
Antimony	Mercury
Arsenic	Nickel
Barium	Potassium
Beryllium	Selenium
Cadmium	Silver
Calcium	Sodium
Chromium	Thallium
Cobolt	Vanadium
Copper	Zinc
Iron	Cyanide
Lead	Sulfide

Magnesium	

Appendix C

Illinois EPA Sample Photographs

SITE NAME:	Sylvan Slough		
CERCLIS ID:	IL0000926220	**COUNTY:**	Rock Island

DATE:	14-Apr-10
TIME:	1550
PHOTO BY:	J.Willman
DIRECTION:	south
COMMENTS:	

Photo of sediment sample location X216

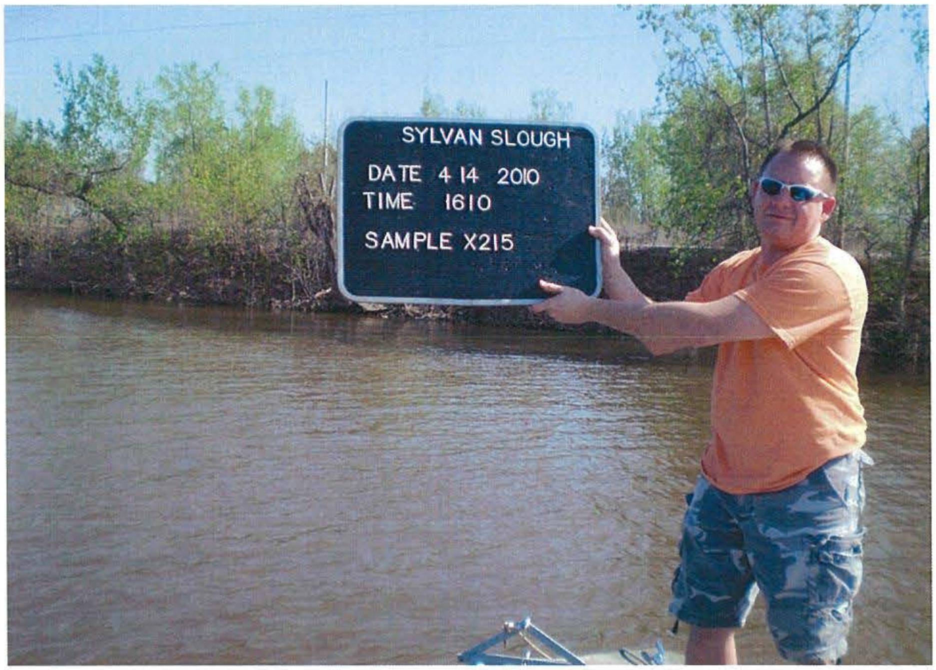
DATE:	14-Apr-10
TIME:	1550
PHOTO BY:	J.Willman
DIRECTION:	north
COMMENTS:	

Photo of sediment sample location X216

SITE NAME:	Sylvan Slough	
CERCLIS ID:	IL0000926220	COUNTY:

DATE:	15-Apr-10
TIME:	1610
PHOTO BY:	J.Willman
DIRECTION:	south
COMMENTS:	

Photo of sediment sample location X215



DATE:	15-Apr-10
TIME:	1610
PHOTO BY:	J.Willman
DIRECTION:	north
COMMENTS:	

Photo of sediment sample location X215

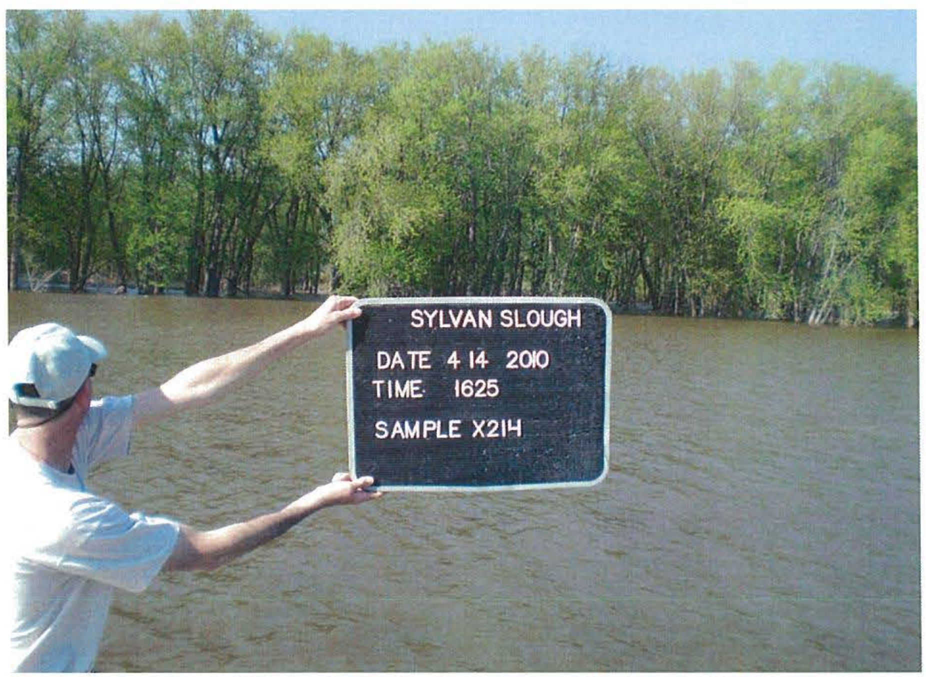
SITE NAME:	Sylvan Slough		
CERCLIS ID:	IL0000926220	**COUNTY:**	Rock Island

DATE:	14-Apr-10
TIME:	1625
PHOTO BY:	J.Willman
DIRECTION:	south
COMMENTS:	

Photo of sediment sample location X214

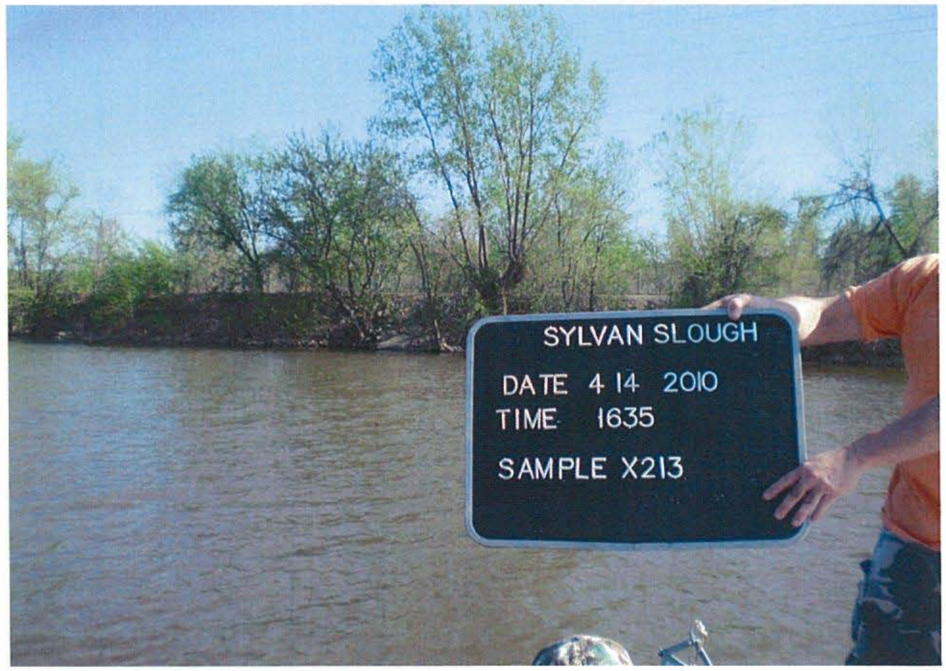
DATE:	15-Apr-10
TIME:	1625
PHOTO BY:	J.Willman
DIRECTION:	north
COMMENTS:	

Photo of sediment sample location X214



SITE NAME:	Sylvan Slough	
CERCLIS ID:	IL0000926220	COUNTY:

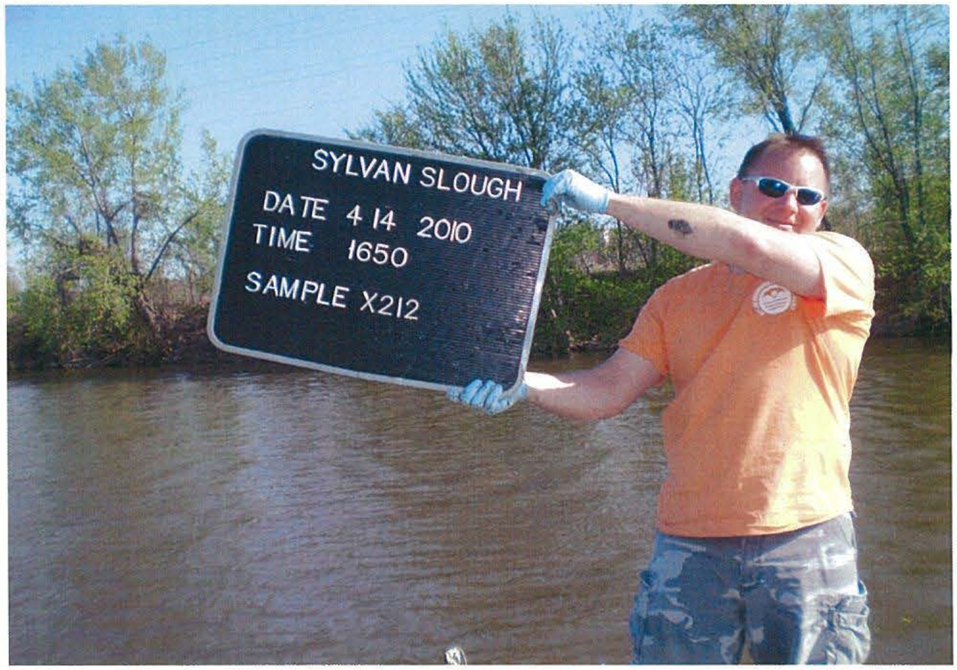
DATE:	14-Apr-10
TIME:	1635
PHOTO BY:	J.Willman
DIRECTION:	south
COMMENTS:	
Photo of sediment sample location X213	



DATE:	14-Apr-10
TIME:	1635
PHOTO BY:	J.Willman
DIRECTION:	north
COMMENTS:	
Photo of sediment sample location X213	

SITE NAME:	Sylvan Slough		
CERCLIS ID:	IL0000926220	COUNTY:	Rock Island

DATE:	14-Apr-10
TIME:	1650
PHOTO BY:	J.Willman
DIRECTION:	south
COMMENTS:	
Photo of sediment sample location X212	

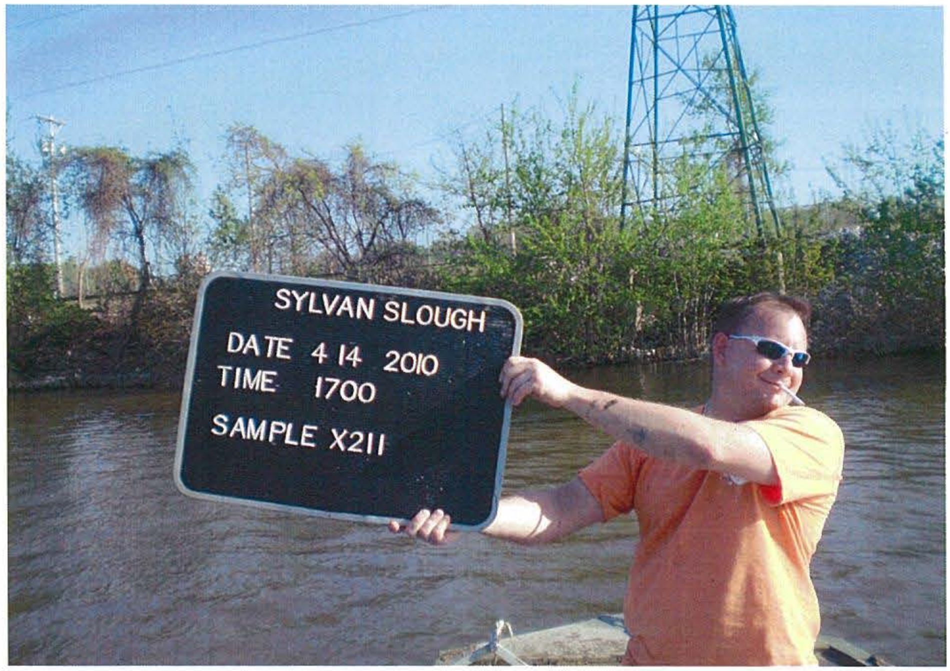


DATE:	14-Apr-10
TIME:	1650
PHOTO BY:	J.Willman
DIRECTION:	north
COMMENTS:	
Photo of sediment sample location X212	

SITE NAME:	Sylvan Slough		
CERCLIS ID:	IL0000926220	COUNTY:	

DATE:	14-Apr-10
TIME:	1700
PHOTO BY:	J.Willman
DIRECTION:	south
COMMENTS:	

Photo of sediment sample location X211



DATE:	14-Apr-10
TIME:	1700
PHOTO BY:	J.Willman
DIRECTION:	north
COMMENTS:	

Photo of sediment sample location X211

SITE NAME:	Sylvan Slough		
CERCLIS ID:	IL0000926220	COUNTY:	Rock Island

DATE:	15-Apr-10
TIME:	0920
PHOTO BY:	J.Willman
DIRECTION:	south
COMMENTS:	

Photo of sediment sample location X210 and duplicate X220

DATE:	15-Apr-10
TIME:	0920
PHOTO BY:	J.Willman
DIRECTION:	north
COMMENTS:	

Photo of sediment sample location X210 and duplicate X220

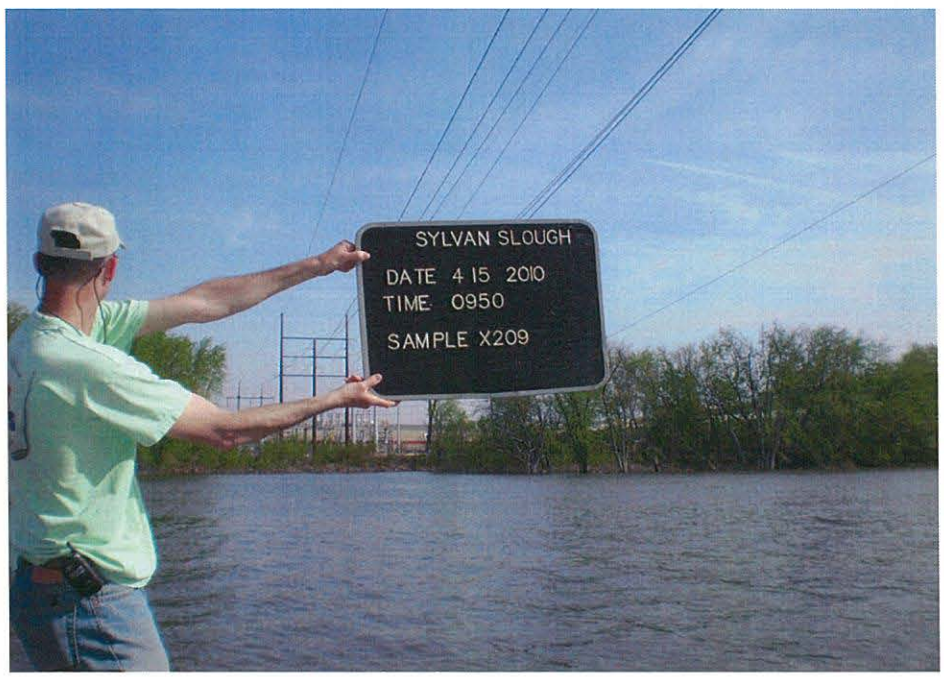
SITE NAME:	Sylvan Slough		
CERCLIS ID:	IL0000926220	**COUNTY:**	

DATE:	15-Apr-10
TIME:	0950
PHOTO BY:	J.Willman
DIRECTION:	south

COMMENTS:
Photo of sediment sample location X209

DATE:	15-Apr-10
TIME:	0950
PHOTO BY:	J.Willman
DIRECTION:	north

COMMENTS:
Photo of sediment sample location X209



SITE NAME:	Sylvan Slough		
CERCLIS ID:	IL0000926220	COUNTY:	Rock Island

DATE:	15-Apr-10
TIME:	1000
PHOTO BY:	J.Willman
DIRECTION:	south
COMMENTS:	

Photo of sediment sample location X208

DATE:	15-Apr-10
TIME:	1000
PHOTO BY:	J.Willman
DIRECTION:	north
COMMENTS:	

Photo of sediment sample location X208

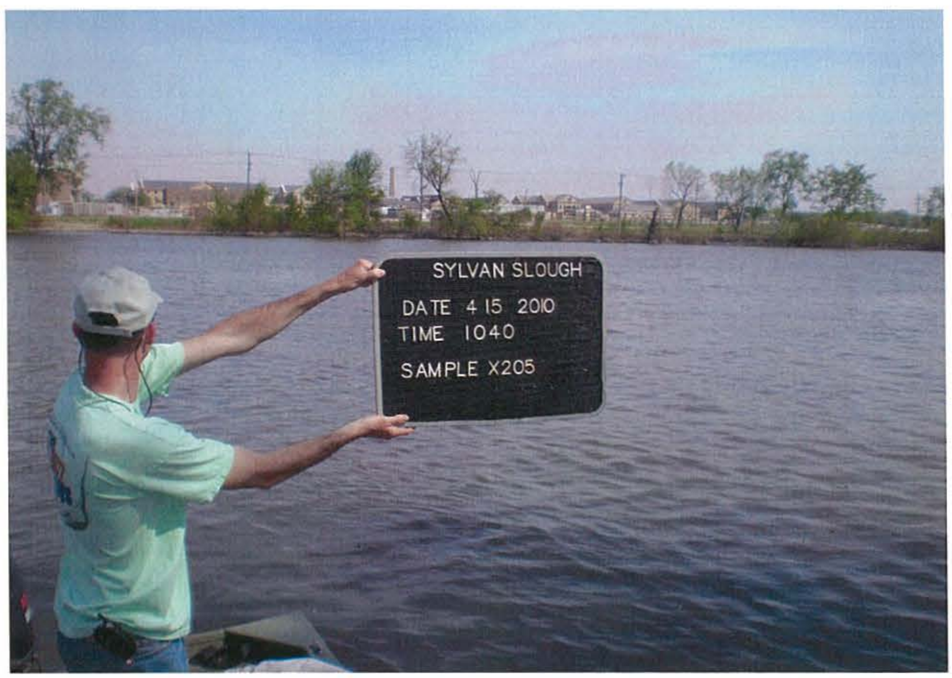
SITE NAME:	Sylvan Slough	
CERCLIS ID:	IL0000926220	COUNTY:

DATE:	15-Apr-10
TIME:	1040
PHOTO BY:	J.Willman
DIRECTION:	south
COMMENTS:	

Photo of sediment sample location X205

DATE:	15-Apr-10
TIME:	1040
PHOTO BY:	J.Willman
DIRECTION:	north
COMMENTS:	

Photo of sediment sample location X205



SITE NAME:	Sylvan Slough		
CERCLIS ID:	IL0000926220	COUNTY:	Rock Island

DATE:	15-Apr-10
TIME:	1100
PHOTO BY:	J.Willman
DIRECTION:	south
COMMENTS:	

Photo of sediment sample location X204

DATE:	15-Apr-10
TIME:	1100
PHOTO BY:	J.Willman
DIRECTION:	north
COMMENTS:	

Photo of sediment sample location X204

SITE NAME:	Sylvan Slough	
CERCLIS ID:	IL0000926220	COUNTY:

DATE:	15-Apr-10
TIME:	1135
PHOTO BY:	J.Willman
DIRECTION:	south
COMMENTS:	

Photo of sediment sample location X203

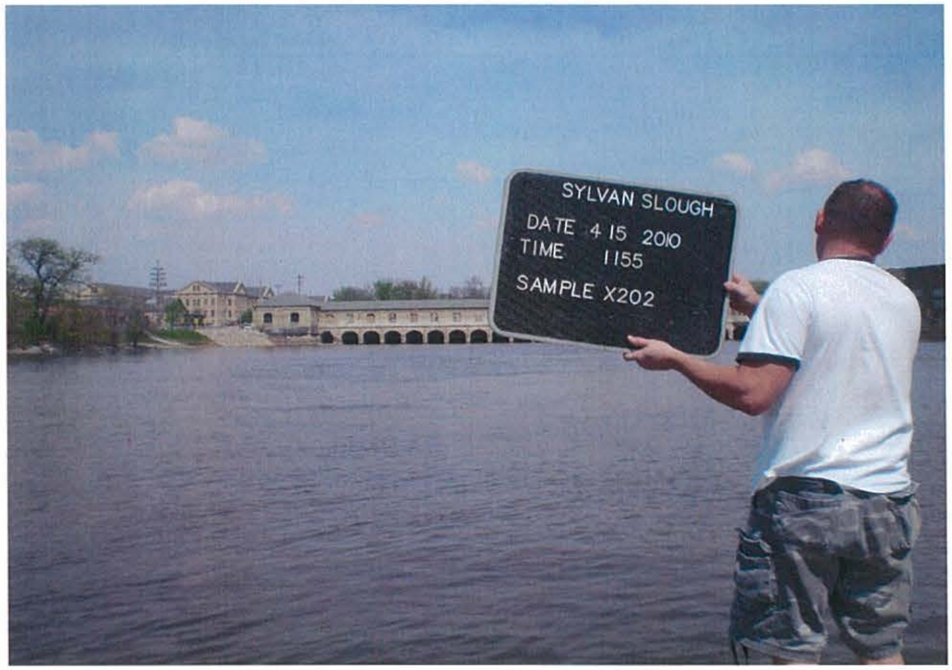
DATE:	15-Apr-10
TIME:	1135
PHOTO BY:	J.Willman
DIRECTION:	north
COMMENTS:	

Photo of sediment sample location X203

SITE NAME:	Sylvan Slough		
CERCLIS ID:	IL0000926220	COUNTY:	Rock Island

DATE:	15-Apr-10
TIME:	1155
PHOTO BY:	J.Willman
DIRECTION:	north
COMMENTS:	

Photo of sediment sample location X202



DATE:	15-Apr-10
TIME:	1155
PHOTO BY:	J.Willman
DIRECTION:	south
COMMENTS:	

Photo of sediment sample location X202

SITE NAME:	Sylvan Slough	
CERCLIS ID:	IL0000926220	COUNTY:

DATE:	15-Apr-10
TIME:	1210
PHOTO BY:	J.Willman
DIRECTION:	south
COMMENTS:	

Photo of sediment sample location X201

DATE:	15-Apr-10
TIME:	1210
PHOTO BY:	J.Willman
DIRECTION:	north
COMMENTS:	

Photo of sediment sample location X201